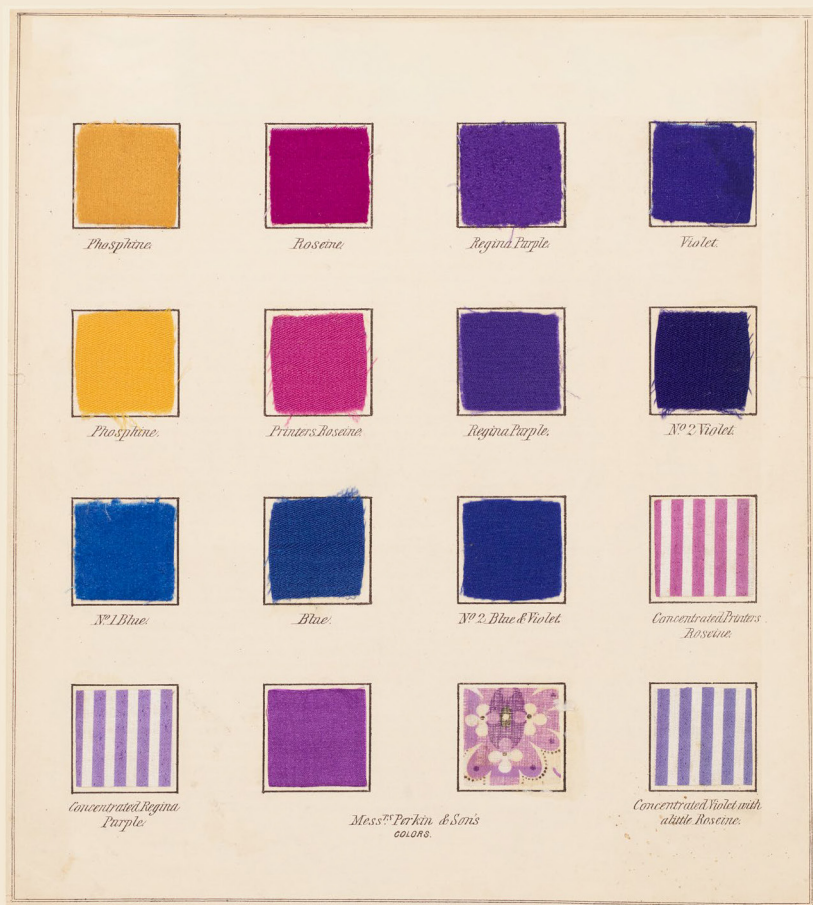


COLOUR MATTERS

EXPLORING CHROMATIC MATERIALITIES IN THE
LONG NINETEENTH CENTURY (1798-1914)



EDITED BY

STEFANO EVANGELISTA, CHARLOTTE RIBEYROL AND
MATTHEW WINTERBOTTOM

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Introduction: Colour Materiality in the Nineteenth Century

*Stefano Evangelista, Charlotte Ribeyrol and
Matthew Winterbottom*

The popular image that the nineteenth century has bequeathed to posterity is one of a colourless age. It is undeniable that, in Britain in particular, the chromatic effects of unprecedented industrial pollution—which ranged from smog and sooty deposits on buildings to the clouding of rivers with sludgy waste—were compounded by the prevalence of sombre fashions and gloomy interiors. This drab palette is reflected in some of the most influential artistic representations of the times. Charles Dickens, for instance, set his popular industrial novel *Hard Times* (1854) in the made-up city of Coketown, whose very name evokes lack of colour to signal a dulling of the aesthetic, emotional and creative faculties. Around this same period, John Ruskin described his own times as ‘one seamless stuff of brown’, compared to the life ‘interwoven with white and purple’ of the Middle Ages.¹ In their different ways, Ruskin and Dickens believed that modernity caused a loss of colour, and saw that loss as an index of combined aesthetic and moral impoverishment. While such interventions by writers and critics undoubtedly exaggerate for rhetorical effect, the invention of black-and-white photography also contributed to our perception of a colourless Victorian age by conveying an effect of hyperrealism while draining colour away from the visual record.

1 John Ruskin, ‘Modern Painters’, in *The Complete Works of John Ruskin in 39 Volumes*, vol. V, ed. by E.T. Cook and Alexander Wedderburn (London: George Allen & Unwin, 1903–12), pp. 321–22.

In contrast to this pervasive stereotype, however, the long nineteenth century stands out for its persistent and multifaceted engagement with colour. In this age of accelerated scientific discovery and empire, colour was an object of curiosity and trade but also an important source of pleasure and a marker of quickly shifting social identities. Scientific observation led to technical innovation, which in turn triggered cultural and artistic responses that constantly challenged practices, habits and categories of perception linked to colour. Nothing encapsulates this fertile exchange between science, industry and culture better than the invention of aniline dyes, which came about at roughly the same time as the works by Dickens and Ruskin that bemoaned the colourlessness of the age. In 1856, British chemist William Henry Perkin succeeded in turning coal—the very stuff of the industrial revolution—into colour. His discovery led to the manufacture of mauveine, the first aniline dye, which was soon followed by a whole rainbow of aniline colourant dyes that were rapidly commercialised and applied to manufacture, both in Britain and across industrial nations in the West.² At the 1862 London International Exhibition, aniline dyes were showcased alongside polychromatic material testimonies of different civilisations and technical innovations from around the world. Indeed, thanks to their durability and cost-effective nature, the new dyes soon became a global phenomenon, revolutionising consumers' tastes and resetting the relationships between European manufacturing countries such as Britain and countries—typically in Asia and Africa—where the extraction of colour from natural resources had so far been concentrated. Thus, while the industrial culture of the nineteenth century may be said to have 'blackened the land', as Stephen Mosley has argued, it also made bright colours more widely available and visible than ever before.³

The aniline revolution highlights the importance of materiality in formulating a nuanced understanding of colour. Given the close relationship of aniline dyes to coal, colour in this period cannot simply be understood in abstract or symbolic terms, but should rather be looked at as constitutive of the material condition of objects: the extraction,

2 Anthony S. Travis, *The Rainbow Makers: the Origins of the Synthetic Dyestuffs Industry in Western Europe* (Bethlehem, PA: Lehigh University Press, 1993).

3 Stephen Mosley, *The Chimney of the World: A History of Smoke Pollution in Victorian and Edwardian Manchester* (Cambridge: The White Horse Press, 2001), p. 72.

chemical constitution, production, circulation and application of colour are all part of the history of those objects and of the stories we can tell about them. Embodied colour informs the impact that objects have on the senses and on society more broadly. Thinking of colour as matter thus enables us to recover the sometimes faint links between aesthetics and socio-economic histories by placing artefacts in relation to the geography of colour production and the geopolitical networks that supported its circulation. It also suggests ways of breaking down the entrenched division, in academic discourse, between disciplines as well as between art forms, especially the decorative and fine arts. It provides ways of reassessing the landmark studies in colour theory that punctuate the long nineteenth century, such as Johann Wolfgang von Goethe's *Zur Farbenlehre* (*Theory of Colours*, 1810) or Michel-Eugène Chevreul's *De la loi du contraste simultané des couleurs* (*The Principles of Harmony and Contrast of Colours*, 1839), as well as the colourful artistic productions of this crucial period, from the glowing hues of Pre-Raphaelite paintings to the first experiments with colour photography at the end of the century.⁴ These key interventions in the history of nineteenth-century colour have often been discussed in abstract, symbolic terms with an almost exclusive focus on colour's intangibility, despite the fact that Chevreul was originally a chemist in charge of the Gobelins dyeworks in Paris and that Goethe was deeply concerned with reconnecting the experience of colour with the body of the observer which Isaac Newton's *experimentum crucis* had overlooked. Addressing the wide-ranging cultural impact of the aniline revolution therefore invites us to revisit in more material terms the complex emergence of colour as a signifier of the modern.

Starting from these premises, this volume seeks to provide a fresh understanding of the materiality of colour in the long nineteenth century by bringing together specialists in art history, literature, anthropology, histories of science and technology, as well as curators and conservators. These fields, we aim to show through the prism of colour, are complementary though they too seldom engage in dialogue

4 Influential nineteenth-century English translations of Goethe and Chevreul include *Goethe's Theory of Colours: Translated from the German; with Notes by Charles Lock Eastlake* (London: John Murray, 1840); Michel-Eugène Chevreul, *The Principles of Harmony and Contrast of Colours and their Applications to the Arts*, trans. by Charles Martel (London: Longman, Brown, Green and Longmans, 1854).

within the compartmentalised world of modern academia. *Colour Matters* arises out of the collaborative research carried out within the ERC-funded project CHROMOTOPE (2019–2025), hosted by Sorbonne Université in collaboration with the University of Oxford and the Conservatoire National des Arts et Métiers in Paris. The project focused on changing attitudes towards colour in the wake of the chromatic turn triggered by the invention of aniline dyes in the 1850s. CHROMOTOPE also supported the exhibition *Colour Revolution: Victorian Art, Fashion and Design* (Ashmolean Museum, Oxford, 21 September 2023–18 February 2024), which brought its academic research to a general audience through 150 colourful objects, ranging from paintings to ceramics, textiles, chromolithographs and pigments and dye samples. The conference ‘Colour Matters: Exploring Colour and Chromatic Materialities in the Long Nineteenth Century (1798–1914)’, where the research in this volume was originally presented, was held in Oxford in December 2023 to coincide with the exhibition.⁵

When discussing colour, it is customary to say that the topic has long been shunned or marginalised in academic study, especially in the humanities. In actual fact, the past two decades have seen the emergence of a new interdisciplinary field marked by a wealth of colour-focused publications and major conferences dedicated to polychrome practices in art, architecture and textile heritage. Building on pioneering cultural histories by Michel Pastoureau and John Gage, colour has become a fast-growing research topic. Already in 2000, Pastoureau argued that thinking about the multifaceted phenomenon of colour would require overcoming disciplinary divides. In his view, the main obstacle to colour studies was the methodological challenge of having to address ‘physical, chemical, material, technical but also iconographical, ideological [...] symbolical’ problems ‘at the same time’.⁶ *Colour Matters* tries to respond to this challenge by adopting a synchronic, rather than diachronic, focus on chromatic materiality, and by drawing on the different kinds of expertise of a multidisciplinary group of scholars in order to offer a

5 Information about the project’s aims and academic activities is available at <https://chromotope.eu/>. For the exhibition catalogue, see Charlotte Ribeyrol et al., *Colour Revolution: Victorian Art, Fashion & Design* (Oxford: Ashmolean Museum, 2023).

6 Michel Pastoureau, *Bleu, Histoire d’une couleur* (Paris: Le Seuil, 2000), p. 6. C.R.’s translation.

variety of case studies and approaches. Although art history plays an important role in many chapters, the scope of the volume as a whole is larger, following Pastoureau's persuasive claim that the history of colour is above all 'a social history', that is, that art is only one of the disciplines involved in creating the cultural meanings of colour.⁷

Both Pastoureau's and Gage's works have played a key role in drawing new attention to dyes and pigments as 'repositories of values in their own right' in order to dispel the 'esoteric' fallacies of a pseudo-universal colour symbolism which has long prevailed in art history and philosophy.⁸ Up until recently, this revision entailed a number of documentary difficulties: how could one adequately discuss and contextualise the colours of an artwork or item of clothing when those colours, as well as the lighting conditions in which they were originally viewed, had evidently changed over time? This question—of urgent importance for scholars working on the distant past—is no less relevant to a period as 'recent' as the nineteenth century, during which sources of light shifted from candle to gas and electricity, and the quest for ever more intense, steadfast and cheap colouring materials was particularly rife. Thanks to the growing collaboration between practitioners of interpretative disciplines such as art history, literature and anthropology, and conservators able to rely on technological innovation (particularly the ongoing development of non-invasive analytical methods) in the field of heritage science, it is now increasingly possible to characterise colour substances and techniques introduced during this key period without compromising the physical integrity of the objects studied, and to reveal what these colours originally *were* and looked like.⁹ Several chapters in this volume bring to light the results of such fruitful collaborations between heritage science and the humanities which, to an extent, go all the way back to the nineteenth century itself: in 1880, William Holman Hunt pleaded that artists try to understand their materials better despite

7 *Ibid.*, p. 8.

8 John Gage, *Color and Meaning, Art, Science and Symbolism* (Berkeley and Los Angeles: University of California Press, 1999), p. 13.

9 See Leslie Carlyle, *The Artist's Assistant: Oil Painting Instruction Manuals and Handbooks in Britain, 1800–1900, with Reference to Selected Eighteenth-Century Sources* (London: Archetype Publications, 2001); Joyce Townsend, Jacqueline Ridge and Stephen Hackney, *Pre-Raphaelite Painting Techniques, 1848–56* (London: Tate Publishing, 2004).

the availability of industrially produced, ready-made pigments and the growing interference of colour suppliers.¹⁰

Interdisciplinary conversations are not only an exciting new development for colour studies: they open new pathways for research within the 'material turn' that is currently having a transformative effect on the humanities. However, as noted by the anthropologist Tim Ingold, it is essential that we 'redirect our attention from the materiality of objects to the properties of materials'.¹¹ As the chapters in this volume show, this shift from materiality to materials is particularly essential in the case of colour, which has for too long been treated as a superficial, decorative quality of objects and artworks. Colour, rather, should be understood as a *substance* with a life of its own, whose new-found autonomy in the artistic sphere became central to romantic aesthetics, as noted by the French poet Charles Baudelaire in his essay on the Paris 1855 International Exhibition: 'Colour thinks by itself, independently of the objects it clothes'.¹²

This was one year before Perkin's invention of mauveine. However, the 'colour revolution' had been underway already since the early decades of the previous century, when the discovery of the first synthetic pigments like Prussian blue contributed to changing the course of the history of colour as well as its geography.¹³ According to Alexandra Loske, the age of industry (which spans from the eighteenth century until the First World War) thus witnessed a shift from immaterial to material approaches to colour.¹⁴ Such material approaches affected both the ways

10 Hunt's lecture on 'The Present System of Obtaining Materials in Use by Artist Painters, as Compared with That of the Old Masters' is mentioned in both Ghigo's and Kinseher's chapters.

11 Tim Ingold, 'Materials against materiality', *Archaeological Dialogues*, 14.1 (2007), 1–16, p. 12.

12 Charles Baudelaire, 'Exposition universelle, 1855', in *Œuvres complètes de Charles Baudelaire* (Paris: Michel Lévy frères, 1868), *Curiosités esthétiques*, 2, p. 241. C.R.'s translation.

13 On Prussian blue, see Sarah Lowengard, 'Prussian Blue: Transfers and Trials', in *The Materiality of Color: The Production, Circulation, and Application of Dyes and Pigments, 1400–1800*, ed. by Andrea Feeser, Maureen Daly Goggin and Beth Fowkes Tobin (London and New York: Routledge, 2012), pp. 167–81; as well as Charlotte Guichard, Anne-Solenn Le Hô and Hannah Williams, 'Prussian Blue: Chemistry, Commerce, and Colour in Eighteenth-Century Paris', *Art History*, 46.1 (February 2023), 2–34.

14 Alexandra Loske, 'Introduction', in *A Cultural History of Color in the Age of Industry* (London, New York, Oxford, New Delhi and Sydney: Bloomsbury Academic, 2021), p. 4.

in which colours were produced and how they circulated, including in print with the perfecting of chromolithography, which heavily relied on synthetic inks. Once the Europeans no longer needed to import materials from distant countries outside their continent, they started producing new pigments and dyes that soon spread across the world, reaching as far afield as Japan and India, thus reversing the traditional trade routes of colouring materials. It is for this reason that several recent publications on pigments and dyes have given special prominence to the nineteenth century as a pivotal moment in the material semiotics of colour in Europe and beyond. For instance, as Georges Roque shows in his study of cochineal red, the perception and use of this colour were indissociably tied to the imperial and commercial concerns which also cut through our volume.¹⁵ Such ‘material semiotics’ are central to our collective approach which focuses less on *hue* than on how the material transformations which colour underwent from the 1850s radically changed the ways it was perceived. In a similar way, Kirsty Dootson—following Natasha Eaton’s discussion of the new ‘chromozones’ of the nineteenth century in *Colour, Art and Empire* (2013)—has shown how the new ‘economy of colour’ which emerged in the mid-nineteenth century ‘was at once contingent on the circulation of chromatic materials but also on the people of colour upon whose labour and lives the British Empire thrived, entangling their histories with the chromatic produce they were forced to cultivate and for which they were traded’.¹⁶

And yet, during this very period in which colouring materials were given new prominence, a dematerialising process was equally perceptible. In *What Color is the Sacred?* (1978), Michael Taussig has noted that modern chemistry ‘killed off the body of colour’ by severing the new anilines from nature.¹⁷ This process reduced pigments and dyes to chemical formulas or names bearing little connection to the formerly organic or mineral origins of colouring materials, notwithstanding the

15 Georges Roque, *La cochenille, de la teinture à la peinture. Une histoire matérielle de la couleur* (Paris: Éditions Gallimard, 2021), p. 19.

16 Kirsty S. Dootson, *The Rainbow’s Gravity, Colour, Materiality and British Modernity* (London: Paul Mellon Centre and Yale University Press, 2023), p. 4; cf. Natasha Eaton, *Colour, Art and Empire, Visual Culture and the Nomadism of Representation* (London: I.B. Tauris, 2013).

17 Michael Taussig, *What Color is the Sacred?* (Chicago: University of Chicago Press [1978] 2009), p. 43.

tremendous impact the mass production and consumption of these modern colours had on the natural world. This new relation to nature, which challenged chromatic taxonomies and transformed artists' understanding of their materials, is one of the key questions addressed in *Colour Matters*. Science's 'reductionist' tendency to 'dematerialize' the stuff of colour, discussed by Diana Young, further coincided with the proliferation of new discourses and theories of colour which pointed towards abstraction and innovation.¹⁸ This well-known story culminates in that quintessential image of artistic modernity: impressionistic and non-figurative painting. In keeping with recent research into the impact of new chromatic technologies like chromolithography on the artistic world,¹⁹ this volume moves away from such formalist approaches in order to try to bridge the gap between *concrete* experimentations with colour (whether industrial, scientific, technical or artistic) and more *abstract* reflections on the chromatic articulated within the fields of philosophy, aesthetics, literature and psychology.

In his anthropological analysis of the 'properties of materials', Ingold has argued that such properties 'cannot be identified as fixed, essential attributes of things, but are rather processual and relational. They are neither objectively determined nor subjectively imagined but practically experienced. In that sense, every property is a condensed story'.²⁰ As Young has shown, this same relationality is fundamental to our understanding of hue (chroma) and materiality.²¹ Each chapter in this volume thus offers a new story about chromatic materials and materialities, thereby restoring 'the expressive potential that colours possess'.²² For many centuries, Europeans claimed that the populations which related and responded to colour most were the least 'civilised'.

18 Diana Young, 'The Colours of Things', in *Handbook of Material Culture*, ed. by C. Tilley, K. Webb, S. Kuechler, M. Rowlands and P. Spyer (London: Sage, 2006), p. 174. See Georges Roque, *Art et science de la couleur, Chevreul et les peintres, de Delacroix à l'abstraction* (Paris: Gallimard, 2009) and Jaqueline Lichtenstein, C. Maigné and A. Pierre, eds, *Vers la science de l'art, L'Esthétique scientifique en France, 1857–1937* (Paris: Presses de l'Université Paris-Sorbonne, 2013).

19 See, for instance, Laura Anne Kalba, *Colour in the Age of Impressionism, Commerce, Technology, and Art* (University Park, Pennsylvania: The Pennsylvania State University Press, 2017).

20 Ingold, 'Materials against materiality', p. 14.

21 Diana Young, *Rematerializing Colour, From Concept to Substance* (Canon Pyon: Sean Kingston Publishing, 2018).

22 Young, 'The Colours of Things', p. 174.

Even Goethe asserted that ‘savage nations, uneducated people, and children have a great predilection for vivid colours’.²³ Such ‘purging of colour’ from culture, as described by David Batchelor in *Chromophobia*, can be directly connected to the stigma of chromatic materiality, whether in the form of body paint, make up or colourful fabrics ‘made out to be the property of some “foreign” body—usually the feminine, the oriental, the primitive, the infantile, the vulgar, the queer or the pathological’.²⁴ But if this age-long association of colour with ‘unworthy’ bodies was what originally led to the ideological exclusion of colour from scientific discourse,²⁵ it is this very multifaceted material dimension which is now one of the most fruitful areas of research in the field of colour studies.

Given that colour can be felt and ‘experienced’ in diverse ways,²⁶ the field of materiality encompasses not only the changing colouring materials which emerged during the long nineteenth century, but also the diverse forms of the embodied observer’s sensuous responses when seeing, handling, tasting, hearing or smelling chromatic matter. Colour’s extraordinary ‘capacity to intensify and vivify the sensory environment’ came to the fore during the nineteenth century, leading to new forms of bodily engagement with chromatic matters as well as the emergence of a new sensorium.²⁷ That the colour revolution was also a ‘sensorial’ revolution is evidenced not only by the well-documented phenomena of synaesthesia but also by the fact that the new dyes were used as food colourants and in the production of synthetic fragrances, despite the foul smell of coal tar.²⁸ If, as anthropologist David Howes has argued,

23 Goethe’s *Theory of Colours*, p. 55.

24 David Batchelor, *Chromophobia* (London: Reaktion Books, 2000), pp. 22–23.

25 See Jacqueline Lichtenstein, *The Eloquence of Color: Rhetoric and Painting in the French Classical Age* (Berkeley: University of California Press, 1993)..

26 See Young, *Rematerializing Colour* and David Howes, *The Sensory Studies Manifesto, Tracking the Sensorial Revolution in the Arts and Human Sciences* (Toronto, Buffalo, London: University of Toronto Press, 2022).

27 Dootson, *The Rainbow’s Gravity*, p. 3; David Howes, *Sensorium: Contextualizing the Senses and Cognition in History and Across Cultures* (Cambridge: Cambridge University Press, 2024).

28 On the use of the new anilines as food colourants, see Caroline Cobbold, ‘Adulation or Adulteration? Representing Chemical Dyes in the Victorian Media’, *Ambix*, 66.1 (2019), 23–50. On the new synthetic fragrances, see Eugénie Briot, ‘Imiter les matières premières naturelles. Les corps odorants de synthèse, voie du luxe et de la démocratisation pour la parfumerie du XIXe siècle’, *Entreprises et histoire*, 78.1 (2015), 60–67; as well as Ericka Wicky, ‘Perfumes: The Future of Synthetic Colours’, *ChromoBase* (2024), <https://chromobase.huma-num.fr/narratives/perfumes-the>

the material turn in the humanities has brought to light ‘the social agency of objects, infrastructures and environment’, this now ‘needs to be augmented by attention to the sensoriality of things to arrive at a full-bodied understanding of living in a material world’.²⁹

This volume is divided into five thematic clusters that put pressure on different aspects of colour materiality within and across different disciplinary contexts and areas of expertise. We begin with chapters that revisit the complex relationship between colour and nature through the prism of material history. Ever since antiquity, humans have extracted pigments and dyes from the natural world. Many colour names refer directly to those of plants, animals or minerals, either to evoke their natural beauty or because they share an actual material connection to them. However, the arrival of the anilines—created in chemical laboratories from industrial byproducts—started a new trend of severing colour from natural imagery, just as the new geopolitical order of the age of empires meant that the global circulation of natural goods reached unprecedented intensity.

In the opening chapter, Ariane Fennetaux teases out the complex dynamics that link the material history of colour to nature, empire and evolving ideas of taste by exploring the fascinating case of the use of coloured feathers in the European fashion industry. On the one hand, imperial expansion increased the global trade in exotic feathers prized for their attractive colours. On the other, however, the same trade helped to galvanise a shared environmental consciousness among those who glimpsed the negative ecological impact caused by the indiscriminate culling of large quantities of wild birds. Once a public debate began in nineteenth-century Britain, it was not too long before the ethics of the use of plumage were discussed in the House of Lords, creating a connection between colour, environmental awareness and political activism.

Natural extraction as a link between aesthetics and politics also provides the focus for Kirsten Travers Moffitt’s study of the history of chrome yellow, a pigment that was manufactured in the United States from the early nineteenth century using native chromium ores. As she shows, the brilliant yellow colour produced from chrome yellow shaped

future-of-synthetic-colours/.

29 Howes, *The Sensory Manifesto*, p. 16.

contemporary American taste in the decorative arts and simultaneously informed discussions of national identity in the period following the American Revolution, which saw a push to maximise the use of the country's national resources.

The long nineteenth century was punctuated by chromatic experiments that highlight the productive intersection between art and natural science. Arguably none of them was as significant or had such long-lasting consequences as the invention of colour photography charted here by Nathalie Boulouch. Boulouch explains the totally different approaches to materiality used to record colour through photography at the turn of the twentieth century: while the method pioneered by the French physicist Gabriel Lippmann in the 1890s was based on recording wavelengths and therefore did not require any pigments or dyes, the slightly later Autochrome invented by the Lumière brothers made use of a natural material—dyed potato starch—in order to reproduce colours by additive synthesis.

Informed by historical research and sometimes by chemical analysis, the chapters in this section on nature and artifice thus document how discussions of colour materiality brought together diverse communities of expertise, including scientists, entrepreneurs, artists and labourers. They show that the study of colour matters takes us deep into humans' relationship with the soil, the land and questions of belonging, but also that these topics cannot be divorced from aesthetics. The colours of objects such as Autochromes or the artificial exotic birds made of dyed poultry feathers described by Fennetaux seduced viewers with their strange beauty, and at the same time challenged ideas of mimesis by suggesting new ways of formulating the relationship between nature and art.

Given the close links between science and nature explored in Part I, it is unsurprising that colour in this period also had an impact on changing understandings of health, both physical and mental. The chapters in Part II address this topic by focusing respectively on the use of colours in Victorian hospitals and on the supposed link between colour and pathological conditions such as hysteria and kleptomania.

Kay Simpson reveals that, in the fast-evolving field of nineteenth-century medical science, there arose a debate on the therapeutic benefits of painting hospital wards with colours that recalled domestic interiors.

Proponents of colour contested both the symbolism and material benefits of the centuries-long practice of whitewashing—the white produced by diluted lime or chalk being associated with a deeply moralised idea of hygiene—in an effort to humanise institutional spaces designated for medical care.

While the examples analysed by Simpson highlight the healing properties of colour and the connection between colour materiality and discourses of hygiene, Alessandra Ronetti reveals a complementary set of anxieties that proliferated in the late century, produced by the fear that colour might have decidedly unhealthy effects. She shows that the gaudy colours made with aniline dyes that dominated the fashion industry from the 1860s came to be associated with nervous pathologies due to overstimulation, to which women were thought to be especially prone.

The diverging views on the impact of colour on health highlighted in these two chapters hark back to a dualism that was already at work in Greek antiquity, where the term *pharmakon* could mean tincture, poison or remedy, connoting the simultaneous toxic and healing powers of colour. In the nineteenth century, this same ambiguity around colour materiality emerges in the intersecting histories of fashion, interior decoration and medicine analysed here (Ronetti also traces the use of colour in the emerging medical fields of psychopathology and experimental psychology). In the age of science, the sensory experience of colour and its affective impact alerted scientists to its potential uses in efforts to understand and regulate emotions.

Part III deepens the investigation of the social function of colour by shifting the focus onto the construction of gender and racial identities. We have already seen with Ronetti that chromatic desire and perception were sometimes thought to affect women in particularly strong and potentially dangerous ways. Indeed, from the 1840s onwards the preponderance of dark and monochrome male fashion for formalwear—whose effect Charles Baudelaire compared to a funeral in his essay ‘On the Heroism of Modern Life’ (‘Salon de 1846’, 1868)—seemed almost designed to shield men from the dangers of colour. Here, however, Fiona Anderson and Dominic Janes explode the persistent stereotype of men in black by describing instances in which colour in fashion aided the expression of male identities.

Anderson documents how the development of the Scottish nineteenth-century tweed industry, influenced by the legacy of Romanticism and the growth in popularity of open-air sporting activities, provided male fashion with a colourful palette that also relied on the new artificial dyes. Refashioned into lounge suits, tweed patterns gradually made their way from Scotland to London and other international metropolitan settings, creating a porous border between rural and urban culture.

Porosity and transition are also key areas of concern for Janes, who examines the satirical depiction of colourful male clothing in Oxford and Cambridge university magazines in the closing decades of the century. While the use of bright colours was standard practice in sporting milieus, the aesthetic movement that flourished in these years—headed by the controversial figure of Oscar Wilde—gave colourful clothing a new and extremely public form of visibility that potentially signalled effeminacy or a homosexual identity. Janes shows that colour in undergraduate male fashions was an ambiguous signifier that could be associated with both privilege and marginalisation. Perhaps the most striking feature of these depictions analysed by Janes is the way that they use colour to bundle together queer and non-white male subjects, creating a bridge between gender non-conformity and racial diversity.

The fact that colour is such a prominent feature of the material condition of the body highlights its importance in processes of identity formation and in determining mechanisms of belonging and exclusion. Helena Neimann Erikstrup examines the politics of representing skin colour in the last chapter in Part III, which focuses on the work of French drawing teacher Victor Fulconis, who developed a fascination with the diversity of skin tones he encountered in the Caribbean colony of Martinique. Erikstrup argues that Fulconis's drawings are far from representing a neutral technique of observation. Instead, they should be viewed as a means of classifying the local Indo-Caribbean population by redeploying anthropological practices of using colour to create racial difference and uphold social hierarchies, especially in colonial settings. When viewed from this perspective, the colourful drawings of colonial Martinique stage an unsettling encounter with the colonial gaze.

Therefore, as these chapters show, excavating the influence of colour materiality on the construction and performance of identity takes us into a number of nineteenth-century disciplines, ranging from sexology

to anthropology and racial science, whose influences can be detected in cultural artefacts as varied as drawings, textiles and student magazines.

The chapters in Part IV study how colour participates in the creation and regulation of systems of thought. If, as many have contended, the taxonomical impulse of European cultures reached an unprecedented momentum in the age of scientific progress and geographical exploration, the science of colour was part of the obsession with labelling the unfamiliar, sometimes leading to disagreement and dispute.

The colour swatches pasted into Patrick Syme's *Werner's Nomenclature of Colour* (1814, 1821) were intended as an aid for precise descriptions: Darwin famously took the book with him on the *HMS Beagle* in order to provide clear records of the unfamiliar flora and fauna he encountered on his world voyage. Here, Joyce Dixon surveys the remaining copies of the book in order to assess what their materiality—in the form of dedications, bookplates, marginalia and the physical marks of reading—can tell us about their use and about chromatic history more broadly.

The challenge faced by taxonomists such as Werner of giving colours accurate and effective names increased with the arrival of the new synthetic dyes, which presented opportunities for enriching the existing chromatic vocabulary with new associations, often with an eye to the lucrative textile market. Magenta, the name given by French chemists to one of the new anilines, has also been one of the most long-lasting. The colour was named after the town in northern Italy where the French and Piedmontese armies conducted a victorious battle against the Austrians in 1859. Delving into the naming history of magenta and other aniline dyes provides Marie-Anne Sarda with an opportunity to study the processes of cultural association and material circulation that underlie colour taxonomies. Her archive is based on English and French patent records, which also show that the aniline revolution was the trigger for an international competition among European countries that vied for primacy in the field of technical innovation.

Even before the advent of the anilines, however, scientific circles were not immune from friction and discord. In the closing chapter in Part IV, Giulia Simonini brings to light a controversy that arose around the theory of trichromacy, which was based on the idea that all colours could be obtained by mixing red, yellow and blue. Her subtle analysis of a group portrait by the English artist John Hayter, in which one of the

sitters is holding a colour diagram, shows that the painting provides a material record of changing scientific and philosophical understandings of colour prompted by new discoveries (in 1852, the German physicist Hermann von Helmholtz established that colourants such as paint and coloured light mix in different ways, challenging the universal valence of trichotomy). A wider question underlying taxonomical discussion is whether colour should be considered as an abstract idea or as something concrete, tied to the material world. The chapters in Part IV approach this question by examining how material objects—books, dyes, paintings—mediated the circulation of colour theories across different disciplinary and practical fields.

The theme of controversy broached by Simonini dominates Part V, which explores how new pigments were simultaneously the objects of curiosity, scepticism and sometimes bitter dispute. While the textile and fashion industries were quick to adapt to technological innovations, the art world approached the changing material forms of colour with more caution, prompted both by aesthetic concerns (did the new dyes look good enough?) and practical considerations about the quality and durability of the new industrial colourants. It is telling that in Britain, John Ruskin, William Holman Hunt and William Morris—all leading members of the artistic establishment—spoke publicly against the coal-based dyes.

Here, Tea Ghigo takes a closer look at the artistic practice of John Ruskin by carrying out a scientific analysis of his watercolours and painting palette. Her results reveal a complex relationship: while Ruskin was ethically opposed to industrial colour manufacture and denounced its potential negative impact on society, he did make use of modern industrial pigments in his own watercolours, likely persuaded by scientific arguments about their durability.

Among the few chemically produced pigments that Ruskin recommended to contemporary artists was Chinese white. Even if it was met with Ruskin's (rare) approval, however, the use of Chinese white in watercolour painting became the object of a controversy outlined by Fiona Mann. The pigment was extensively criticised in conservative quarters; nonetheless, avant-garde artists used Chinese white to bolster the status of the medium of watercolour in order to appeal to the exhibition market, dominated by oil paintings, and to wealthy patrons.

Finally, Kathrin Kinseher takes us to Germany, where a brown pigment called ‘mummy’—which was traditionally produced by grinding up actual Egyptian mummies—became the object of a legal dispute between Adolf Wilhelm Keim, founder of an association for the quality control of painting methods, and a manufacturing company.

The disputes studied in Part V gave public resonance to matters of colour, extricating them from specialised scientific discourses, subjecting them to public scrutiny and projecting them into the media. This process of amplification ensured that, in the course of the long nineteenth century, interest in colour reached an ever broader, ever larger non-specialist public. Research in Part V unpacks this phenomenon by combining art history with the history of science, conservation and technical analysis. Inevitably, the questions raised by these last chapters take us back to the relationship with the natural world with which the volume opens, highlighting concerns with industrialisation, adulteration and pollution that also became ever more prominent in this period.

What can the history of nineteenth-century colour materiality contribute to our understanding of colour in the present? Arnaud Dubois provides a possible answer in his epilogue, where he introduces ChromoBase: the open-access database of nineteenth-century chromatic objects linked to the CHROMOTOPE research project, which extends the research into colour materiality presented in this book. Dubois invites us to reflect on how the invention of the pixel—the smallest constitutive element of the digital image—in the second half of the twentieth century has completely changed the ways that colour images are created and displayed, enabling us to visualise the material archives of the past with an unprecedented degree of precision. The same could be said of the methods for the scientific analysis of pigments and dyes which several chapters in this volume draw on, which have done much to bring to light past chromatic practices that are otherwise invisible in the archive.

The research collected in this volume shows us the advantages that can be gained by unravelling the stories and different kinds of disciplinary expertise that colour weaves together. It also shows us that an enhanced historical understanding of colour matters in the long nineteenth century has an impact on fields of knowledge that were barely constituted at the time, from feminism to conservation, from

museum studies to ecocriticism. Not least, understanding how colour was made, used, experienced and discussed in the past, as well as how it moved across spaces and connected different communities, is a way of ensuring that our chromatic heritage is preserved for the future at a time when there is a renewed, and urgent, interest in forging a positive dialogue between traditional methods of colour-making respectful of our natural environment and the new industrial technologies that still shape consumer cultures around the world.

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PART I

1. ‘Nature Is so Much Better than Dyeing [...] You Cannot Get the Same Colour’: Colourful Feathers, Nature and Artifice in the Age of Empires

Ariane Fennetaux

The rise of the empire saw the arrival of some unprecedentedly colourful feathers in the material and chromatic vocabulary of nineteenth-century western fashion. Pondering the natural beauty of feathers, the author of an 1838 French featherworking manual exclaimed: ‘What material covers the body of birds with such rubies, emeralds, topazes and sapphires and whatever else glitters like gemstones and gold sparkles? When will the progress of chemistry allow us to understand precisely the colouring material and the make-up of such material?’¹ Predating the introduction of chemical dyeing, this statement interestingly sets the colouring of natural feathers as a challenge for chemistry. If traditional natural dyes were thought to be no match in reproducing the multicoloured beauty of feathers, how did the colour revolution and its synthetic dyes fare?

Feather dyeing had existed in Europe since at least the Renaissance.² All kinds of feathers, including cock and goose feathers, were dyed. Ostrich plumes, however, occupied a special place in the art and development of feather dyeing. In their natural state of either white,

1 *Nouveau manuel du fleuriste artificiel ou l’art d’imiter d’après nature toute espèce de fleurs suivi de l’art du plumassier* Par Mme Celnart (Paris: Librairie Encyclopédique de Roret, 1838), p. 239. All translations from French are my own unless stated otherwise.

2 Marie Colas des Francs, ‘Les plumes teintes et fausses fleurs du frère Sébastien de Saing Aignan’, *Documents d’Histoire Parisienne*, 25 (2023), 77–92.

black or greyish-brown, they peculiarly lacked the vibrant colours of other exotic birds whose plumage became increasingly available in Europe with the development of trade routes and the expansion of empires. Compared to other feather types, their composition and texture also allowed them to take dyes particularly well.³ When ostrich farms were set up in South Africa from the 1850s onwards and later also in North America in response to the growing demand for fashionable feathers, feather dyeing expanded correspondingly, making use of the newly developed aniline dyes.⁴ The second half of the nineteenth century thus saw the conjunction of different developments which this chapter proposes to bring together: the expansion of European Empires, which fuelled an appetite for colourful exotic feathers and broadened the chromatic expectations and tastes of western consumers; the development of aniline dyes and the impact of their vibrant, fast colours on feather dyeing; and a growing environmental consciousness, leading to the condemnation of the destructive use of the colourful plumage of wild birds.⁵

Lately, an increasing body of work has been dedicated to fashionable feathers.⁶ As far as the nineteenth century goes, the ostrich feather industry and the mounting outcry against the use of wild birds have

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- 3 See Jean-Marie Roland de La Platière, *Encyclopédie méthodique. Manufactures, arts et métiers, Volume 1, Tome 1* (Paris: Chez Pancoucke, 1783).
 - 4 On the ostrich feather trade, see Sarah Abrevaya Stein, *Plumes. Ostrich Feathers, Jews and a Lost World of Global Commerce* (New Haven and London: Yale University Press, 2008).
 - 5 On the impact of aniline dyes on fashion, see *Colour Revolution: Victorian Art, Fashion and Design* ed. by Charlotte Ribeyrol, Matthew Winterbottom and Madeline Hewiston (Oxford: Ashmolean Museum, 2023). See also Augusti Nieto-Galan, *Colouring Textiles. A History of Natural Dyestuffs in Industrial Europe* (Dordrecht & Boston: Springer, 2001); Robert Fox and Augusti Nieto-Galan, *Natural Dyestuffs and Industrial Culture in Europe, 1750-1880* (Canton: Science History Publications, 1999).
 - 6 On recent work on feathers in nineteenth-century and later fashion, see June Swan et al., *Birds of Paradise: Plumes & Feathers in Fashion* (Tiel: Lannoo Publishers, 2014); Robin W Doughty, *Feather Fashions: A Study in Nature Protection* (Berkeley & London: University of California Press, 1975); Malcolm Smith, *Hats. A Very Unnatural History* (East Lansing, MI: Michigan State University Press, 2020); Sarah Abrevaya Stein, *Plumes. On the earlier use of feathers in fashion*, see Elisabeth Gerner, 'Fancy Feathers: The Feather Trade in Britain and the Atlantic World', in *Material Literacy in Eighteenth-Century Britain: A Nation of Makers*, ed. by Serena Dyer and Chloë Wigston Smith (London: Bloomsbury Academic, 2020), 195–218; Elisabeth Gerner, '"Feather Muffs of All Colours": Fashion, Patriotism and the Natural World in Eighteenth-Century Britain', *Appearance(s)* 11 (2022), <https://doi.org/10.4000/appearances.3713>.

been the main foci of research.⁷ Colour has remained marginal to these studies, featuring at best as one of the generic appeals of feathers, alongside texture and movement. Conversely, whereas there has been extensive scholarship on dyeing—pre and post aniline dyes—little attention is usually paid to its use beyond textiles.⁸ With the exception of Marie Colas des Francs's article on feather dyeing in sixteenth-century Paris, no research has been carried out specifically on the art of colouring feathers.⁹ The impact of aniline dyes in the second half of the nineteenth century and their potential to colour feathers at a time when the fashion for colourful exotic feathers reached unprecedented heights have not been studied. In the same time period, growing environmental consciousness led to debates about the protection of wild birds as well as human relations to nature.¹⁰ Drawing these often disparate historiographical threads together, this chapter intends to look at the dyeing of feathers in the nineteenth century within the context of, on the one hand, the increased circulation of exotic feathers in the West and, on the other, the introduction of coal tar dyes. Both developments exhibited fraught relations to the natural and the artificial in the context of empire.

The exotic plumage that passed through London's docks and warehouses can illuminate the entangled links between feathers, nature and empire. A hub for feathers either hunted or farmed in the four corners of the British Empire—from Cape Colony, to India, to New Guinea and the West Indies—London was the centre of the global

7 Doughty, *Feather Fashions: A Study in Nature Protection*; Smith, *Hats. A Very Unnatural History*; Tessa Boase, *Mrs Pankhurst's Purple Feather. Fashion, Fury and Feminism. Women's Fight for Change* (London: Aurum Press, 2018); Michael Shrubb, *Feasting, Fowling and Feathers: A History of the Exploitation of Wild Birds* (London: T & AD Poyser, Bloomsbury Academic, 2013); R.J. Moore-Colyer, 'Feathered Women and Persecuted Birds: The Struggle against the Plumage Trade, c.1860–1922', *Rural History*, 11, 1 (2000), 57–73.

8 On dyeing in the early-modern era, see in particular Dominique Cardon, *The Dyer's Handbook: Memoirs of an 18th-century Master Colourist* (Oxford: Oxbow Books, 2020); Dominique Cardon, *Des couleurs pour les Lumières. Antoine Janot, teinturier occitan 1700-1778* (Paris: CNRS éditions, 2019); Dominique Cardon and Iris Bremaud, *Les 157 couleurs de Paul Gout. Paul Gout's 157 Colours* (Merinchal: Veilles racines et jeunes pousses, 2023); Anita Quye, Dominique Cardon and Jenny Balfour-Paul, 'The Crutchley Archive: Red Colours on Wool Fabrics from Master Dyers, London 1716-1744', *Textile History*, 51.2 (2020), 119–66.

9 On feather dyeing in the Renaissance, see Colas des Francs, 'Les plumes teintes et fausses fleurs du frère Sébastien de Saint Aignan'.

10 Moore-Colyer, 'Feathered Women and Persecuted Birds'.

feather trade: an eminently extractivist colonial enterprise. Paris, on the other hand, was particularly active in feather preparation and especially dyeing: a craftsmanship delicately poised between the natural and the artificial. Dyers were lending artificial colours to feathers which came from domestic species or species like ostrich that had been domesticated for profit. The progress of chemical dyeing seemed to hold the promise of artificially imitating any natural colour, however vibrant. In the emerging debate about the protection of wild birds, the artificial dyeing of farmed feathers was sometimes presented as a virtuous alternative to the destructive use of wild birds. However, examination of patents taken by Parisian feather dyers, of extant feather preparations and of commercial dye recipes shows the particular complexity of the relationship between nature and artifice. Not only were feathers often dyed in starkly unnatural ways, but the advent of tar-based dyes did not completely obliterate the use of natural ingredients, many of which—like indigo, turmeric or logwood—were sourced from Europe's colonies.

Combining research into dye recipes, company archives from both sides of the Atlantic, patents taken out by feather dyers, and material sources in museums, this chapter contextualises nineteenth-century feather dyeing practices within the longer history of feather dyeing and the construction of empires. In the process, it positions late nineteenth-century feather dyeing as a rich conundrum that allows us to explore the entangled histories of nature and artifice in the age of empires.

Feathers in Fashion

With the expansion of trade routes from the sixteenth century onwards, the range of birds used in fashion diversified and the use of exotic species intensified.¹¹ Eighteenth-century instructions for featherwork

11 On the fashion for exotic feathers in sixteenth-century Europe, see Ann Rosalind Jones, 'Les plumes du pouvoir. Commerce, circulations et appropriations des plumes du monde en Europe au XVI^e siècle', in *Objets Nomades: Circulations matérielles, appropriations et formation des identités à l'ère de la première mondialisation, XVI^e-XVIII^e*, ed. by Ariane Fennetaux, Anne-Marie Miller-Blaise and Nancy Oddo (Turnhout: Brepols, 2020), pp. 80–97. On seventeenth-century fashions and feathers, see Margaret W. Ferguson, 'Feathers and Flies: Aphra Behn and the Seventeenth Century Trade in Exotica', in *Subject and Object in Renaissance Culture*, ed. by Magreta de Grazia, Maureen Quilligan, and Peter Stallybrass (Cambridge: Cambridge University Press, 1996), pp. 235–59. On the fashion for ostrich feathers

cited ostrich along with heron, cock, goose or vulture as bird species typically used in millinery.¹² In 1838, alongside the aforementioned birds, a French manual also listed jays, pheasants, toucans, marabous and hummingbirds as well as egrets from Bourbon, Madagascar, Siam, Senegal or Canada.¹³ The same manual cites hummingbirds and birds of paradise as recent additions to the repertoire of featherworkers. About the latter species, the author writes: 'Lately, the tail of this magnificent bird has ranked within the most exclusive ornaments'.¹⁴ If birds of paradise had been known to Europe since the Renaissance, they only gradually came to be used for fashion.¹⁵ When Buffon described birds of paradise, he noted their relatively recent adoption: 'It has hardly been a century since [their feathers] started being used in Europe along with those of ostriches. Undeniably they are particularly well fitted for ornament and fashion because of their lightness and their brightness'.¹⁶ Fluffy marabou feathers which came from the Indian subcontinent were highly prized: 'there are no other Indian plumes so highly prized, and as an article of commerce, the marabouts' are the most important', *The Asiatic Journal* declared in 1834.¹⁷ In its section on skins, furs and feathers, the jury's report on the 1851 exhibition noted how marabou feathers were 'imported into this country from Calcutta in great quantities'.¹⁸

Museum collections confirm the wide use of exotic feathers in millinery preparations, with egrets, hummingbirds or birds of paradise regularly integrated into late nineteenth-century hats and other fashion ornaments. Sometimes individual feathers of birds were included in

more particularly, see Catherine Howey, 'The Vain, Exotic and Erotic Feather: Dress, Gender and Power in Sixteenth and Seventeenth-Century England', in *Religion, Gender and Culture in the Pre-Modern World*, ed. by Alexandra Cuffell and Brian Britt (Basingstoke: Palgrave Macmillan, 2017), pp. 211–40.

12 de la Platière, *Encyclopédie méthodique. Manufactures, arts et métiers, Volume 1, Tome 1*, p. 250.

13 *Nouveau manuel du fleuriste artificiel*, p. 224.

14 *Ibid.*, p. 224, p. 233.

15 Doughty, *Feather Fashions: A Study in Nature Protection*, pp. 9, 11. See also Smith, *Hats. A Very Unnatural History*, p. 53.

16 George-Louis Leclerc, comte de Buffon, *Histoire naturelle des oiseaux*, vol. III (Paris: Imprimerie Royale, 1775), p. 155.

17 *The Asiatic Journal and Monthly Register for British and Foreign India, China and Australia*, vol. 15 (1834), p. 311.

18 *Great Exhibition, Reports by the Juries on the Subjects in the Thirty Classes into which the Exhibition was Divided* (London: printed for the Royal Commission by William Clowes & Sons, 1852), p. 387.

feather compositions or accessories, while at other times whole birds were used. The striking hummingbird jewellery made by Bond Street jeweller Harry Emanuel is representative of the decorative use of exotic birds in novelty accessories in the third quarter of the nineteenth century. After taking out a patent in July 1865 for a new technique for mounting feathers onto a frame 'in gold, silver or other metallic substance' to which he 'affix[ed] the feather or plumage of birds, preferring those which are celebrated for their varied effects of colour and light', Harry Emanuel made a speciality of mounting tiny hummingbird heads onto jewellery.¹⁹ Several examples survive in British collections, including earrings and a necklace (Figure 1.1).²⁰



Fig. 1.1. Harry Emanuel, hummingbird earrings, c.1865, Victoria and Albert Museum, inv. M.11:1, 2-2003.

As skins or single feathers, bird specimens coming from India, the West Indies, Southeast Asia and Africa all converged in London to be sold on to featherworkers and milliners across Europe and the wider world.²¹ London auction lists spell out the variety, scale and geographic scope the sector had reached by the end of the nineteenth century. Over a period

19 Letters patent to Harry Emanuel, of New Bond Street, 5 July 1865 (no. 1779). See also Gates Sofer, 'Investigation of a Victorian Ornithological Adornment', *Conservation Journal V&A*, 57 (2009), 2–3.

20 See also, for instance, British Museum, inv., 1993,0205.1, https://www.britishmuseum.org/collection/object/H_1993-0205-1. Another pair of hummingbird earrings is inv. AP.259-1875, <https://collections.vam.ac.uk/item/O1126618/earring/>.

21 Moore-Colyer, 'Feathered Women and Persecuted Birds', p. 60.

of barely a few months, between December 1884 and April 1885, one outraged letter to the editor of *The Times* claimed there had been over 400,000 West Indian and Brazilian birds and over 300,000 East Indian birds sold by a London auction house, including as many as 6,848 birds of paradise and 4,974 Impeyan pheasants.²² Evidence given by one witness to the Select Committee of the House of Lords in 1908, when the Plumage Prohibition Bill was first discussed in Britain, mentions that a total of 28,301 birds of paradise and the equivalent of 115,000 herons were sold in 1907; while at a sale in June, 1,386 heads of crowned pigeons, 200,000 kingfishers and 200 lyre birds' tails were transacted.²³ In the words of American zoologist William Temple Hornaday:

London is now the head of the giant octopus of the 'feather trade' that has reached out its deadly tentacles into the most remote wilderness of the earth and steadily is drawing in the 'skins' and 'plumes' and 'quills' of the most beautiful and most interesting unprotected birds of the world [...] from the trackless jungles of New Guinea, round the world both ways to the snow-capped peaks of the Andes, no unprotected bird is safe. The Humming birds of Brazil, the Egrets of the world at large, the rare Birds-of-Paradise, the Toucan, the Eagle, the Condo and the Emu, all are being exterminated to swell the annual profits of the millinery trade.²⁴

Colour was key to the appeal of exotic feathers, as summed up in 1908 by one of the witnesses at the Select Committee of the House of Lords: 'These bright birds' feathers are as a rule much dearer than feathers that are not so bright'.²⁵ The brighter the feather, the more sought after it was.

Colour and the Dyeing of Feathers

Colourful feathers had always held an appeal in fashion. Matthäus Schwartz's visual fashion autobiography, spanning the years 1515 to 1560, shows him wearing ostrich feathers in bright yellow, blue and red

22 Letter to the editor, 'The Destruction of Birds of Beautiful Plumage', *The Times*, issue 31527, 17 August 1885.

23 *Report from the Select Committee of the House of Lords on the Importation of Plumage Prohibition Bill [HL] Together with the Proceedings of the Committee, Minutes of Evidence and Appendices* (London: His Majesty's Stationary Office, 1908), p. 2.

24 *The Plume Question in a Nutshell* (London: Royal Society for the Protection of Birds, 1913), p. 4. Some of the imagery here seems to be borrowed from James Buckland's *The Plumage Bill in Relation to the British Empire*—see, for instance, pp. 4 and 9.

25 *Report from the Select Committee of the House of Lords*, p. 25.

as well as white, grey and black.²⁶ A rare survival of a Tudor hat also shows the successful application of green dye to ostrich feathers, while a seventeenth-century German manuscript features a featherworker with purple ostrich feathers.²⁷ In the eighteenth century, if pure white ostrich feathers made a notable appearance in women's hairstyles in the 1780s and 1790s, the feathers of other birds had frequently been dyed to make colourful tippets, muffs or other accessories and millinery.²⁸ Surviving muffs of dyed cock feathers in vibrant tints of pink and purple illustrate the level of expertise achieved by eighteenth-century featherworkers before the advent of chemical dyeing.²⁹

Since feathers are made of keratin, an animal protein, the same dyeing processes could be applied to them as to other proteinaceous materials like wool or silk. Recipes for dyeing feathers prior to the mid-nineteenth-century colour revolution resulted in an increasingly wide range of colours achieved. However, despite the claim of the French 1644 compendium of recipes by Sébastien de Saint Aignan, studied by Marie Colas des Francs, that it contained recipes for dyeing feathers 'in all colours', the only tints it provided recipes for were reds, greens, light purple, brown and yellow.³⁰ Building on this palette, de la Platière's 1781 article on featherworking gives instructions for different reds including '*prune de monsieur*', celestial blue, green, lilac, yellow, grey, orange and '*ponceau*'. His description of the trade also hints at the likelihood that

26 *The First Book of Fashion. The Book of Clothes of Matthaeus and Veit Konrad Schwarz of Augsburg*, ed. by Maria Hayward, Ulinka Rublack, and Jenny Tiramani (London: Bloomsbury Academic, 2015). In one instance, Schwartz also wore black feathers with gold leaf details painted on the quill.

27 The Bristowe hat is made of red silk tufting with several ostrich feathers dyed in green (Historic Royal Palaces inv. 3503710). The manuscript is Anonymous, 'Johann Wurmbein Federschmückher', in *Hausbuch der Mendelschen Zwölfbrüderstiftung*, seventeenth century. Nürnberg Stadtbibliothek, Amb. 317b.2°, fol. 151v, https://online-service.nuernberg.de/viewer/image/0f5e1d20-0f54-473b-9516-8cf87c93689a/308/LOG_0308/. I thank Marie Colas des Francs for this reference.

28 On ostrich feathers in eighteenth-century fashion and their representation in graphic satire, see Caitlin Blackwell, 'The Feather's Fair in a Fright: The Emblem of the Feather in Graphic Satire of 1776', *Journal for Eighteenth-Century Studies*, 36.3 (2013), 353–76. On feather muffs and tippets, see Gerner, 'Feather Muffs of All Colours'.

29 See, for instance, Metropolitan museum, inv. 2009.300.1397, <https://www.metmuseum.org/art/collection/search/156107> and Norsk Folkemuseum, inv. NF.1949-1504, <https://digitaltmuseum.org/011023180540/muffe-i-eske>.

30 Colas des Francs, 'Les plumes teintes et fausses fleurs du frère Sébastien de Saint Aignan', p. 77, on INHA Ms 3.

some colours (referred to as 'fire colours' or '*les couleurs de feu*') required the intervention of the Gobelins workshop and could not be achieved by featherworkers themselves.³¹

As ostrich farming developed in South Africa and North America and the consumption of feathers increased at the end of the nineteenth century, feather dyeing emerged as a specialist trade. Entirely dedicated to feather dyeing, Paul Alexander's *The Practical Ostrich Feather Dyer* (1888) published recipes for different hues and set out the ingredients and equipment required in the 'dye room' of featherworkers.³² These dedicated rooms became a feature of featherworking companies, some of which had entire specialised dyeing departments.

The Cawston Ostrich farm was the first ostrich farm in the USA. It was founded by Edwin Cawston in 1886 in California. First located in Norwalk, it was established in Pasadena in 1896 and supplied ostrich feathers to the fashion trades while also operating as a tourist attraction.³³ In the first decades of the twentieth century, it had three washers and four dyers on its payroll.³⁴ After management, dyers were the highest paid workers, with the head dyer receiving as much as thirty-five dollars per week. In comparison, a feather curler was receiving eight dollars and a feather sewer as little as four dollars per week.³⁵

Other companies contracted out to specialist feather-dyeing companies instead of running an internal dyeing department. The archives of the Lemarié house, founded in Paris in 1888, show the company regularly employing specialist feather dyers. Alexandre Cambier, whose billhead announced that he carried out '*teinture de plumes à façon*' [the dyeing of feathers to order], was one of several feather dyers who billed Lemarié for their work, with bills of upwards of 1200 francs in 1891 and one bill totalling 681 francs and 10 centimes for the sole month of August of that year. In the same year the company also contracted E. Gille, whose billhead describes him as carrying out '*teinture de plumes à façon* [...] *spécialiste d'oiseaux en toutes nuances et*

31 Jean-Marie Roland de la Platière, *Encyclopédie méthodique. Manufactures, arts et métiers, Volume 1, Tome 1*, p. 253.

32 Alexander Paul, *Practical Ostrich Feather Dyer* (Philadelphia: Mrs Dr. M Frank, 1888).

33 Stein, *Plumes*. See also 'Cawston Ostrich Farm Papers' (1898–1952), Huntington Library, San Marino.

34 Cawston Ostrich Farm papers (1898–1952), Huntington Library San Marino.

35 *Ibid.*

du dégradé [the dyeing of feathers to order, specialising in all kinds of coloured birds and of graded shades].³⁶ Colour evidently mattered in the Lemarié house, just as it did at the Cawston ostrich farm.

A further sign of the increasing specialisation of the trade is the commercial production of dyes specifically formulated for feathers. A whole new sector of the industry developed in the second half of the century, offering ready-to-use compositions for the twin trades of feather dyeing and flowermaking, crafts which were historically linked. In the 1890s, for instance, the Parisian flower maker Eugène Georges Ardouin sold different 'fine colours for flowers and feathers' and 'dyeing products for fashion articles'.³⁷

In the introduction to *The Practical Ostrich Feather Dyer*, Alexander Paul notes the development of feather dyeing in the last decades of the nineteenth century: 'feather dyers a dozen years ago were scarce, and the art (if in those days it could be called such), was controlled to a great extent by the French'.³⁸ France was indeed the centre for feather preparation and had developed specific expertise in dyeing. Patents taken out in France in the 1860s show French feather dyeing to have been a particularly dynamic sector. With eighteenth-century and early nineteenth-century recipes increasingly making use of indigo, saffron, Brazil and India wood or achiote, feather dyeing practices had quickly adapted to the changing practices of textile dyeing, and in particular to the arrival of exotic dye materials. The advent of the colour revolution in the 1850s was just as swiftly integrated into these practices. Despite

36 Lemarié archives, bills.

37 This description appeared on their labels: see, for instance, the bottles of dyes kept in the Mucem museum in Marseilles as part of the Francou collection (inv.1972.150.675, https://lescollections.mucem.org/objet?uri=http://data.mucem.org/c/253966&term=1972.150.675&object_pos=0&object_max=1; inv. 1972.150.677, https://lescollections.mucem.org/objet?uri=http://data.mucem.org/c/266489&term=1972.150.677&object_pos=0&object_max=1 or inv. 1972.150.717, https://lescollections.mucem.org/objet?uri=http://data.mucem.org/c/219970&term=1972.150.717&object_pos=0&object_max=1). Eugène Georges Ardouin, who went by the name of Jules Ardouin, also appears as a seller of '*couleurs fines pour fleurs*' [fine colours for flowers] in the trade directory *Paris Adresses: Annuaire general de l'industrie et du commerce: Corps constitués, administrations, professions liberales, rentiers etc. de Paris et du département de la Seine* (Paris: Société anonyme de l'annuaire paris adresses, 1902), p. 175. Ardouin's business was taken over by a former employee named H. Dupont. Today, H. Dupont is still a recognised brand for dye materials, selling specialist products for the dyeing of flowers and feathers.

38 Paul, *Practical Ostrich Feather Dyer*, p. 2.

Paul's claims that 'it is not necessary for a man to be a chemist to be a practical feather dyer, other authorities to the contrary notwithstanding',³⁹ the art of the practical feather dyer did depend in large parts on the new chemistry of colour brought about by tar-based dyes. The recipes included in the book show that ingredients such as rocceline, saffranine, oxalic acid, Bichromate of potash or aniline blue had become part of the feather dyeing process. These ingredients made it possible, in theory, to artificially produce any colour imaginable. Listing recipes for over fifty different colours, *The Practical Ostrich Feather Dyer* presents 'recipes, simple, yet complete in every detail, for dyeing every color and shade of color known'.⁴⁰ Each recipe is accompanied by a sample of dyed feathers, giving material form to the expanded chromatic vocabulary brought about by chemistry. Samples in the book, just like those in the contemporary Lemarié archives, capture the chromatic subtleties made available by the introduction of chemical dyeing, with hues ranging from the subtlest pastel tints to the most vibrant colours.

Common poultry feathers—often goose—as well as ostrich feathers were dyed in various shades of bright pink or blue, purple, burgundy, green or yellow to create different fashionable accessories. Sometimes dyed feathers were assembled to recreate naturalistic bird wings or even whole birds. Several such examples can be found in the stock of a pre-First World War millinery shop in Roubaix, now in the collections of the Mucem museum.⁴¹ A daring combination of large, bright pink goose feathers, small, light turquoise (possibly natural) feathers and a single cock feather dyed in a luminous yellow form a striking bird wing.⁴² Another composition uses common dyed feathers to imitate a small bird, with a deep blue body and fluffy black tail.⁴³ There is even a fake bird of paradise fashioned out of a combination of naturally coloured and artificially dyed feathers. While the body is made of light green feathers, the distinctive flowing tail of birds of paradise is here imitated

39 *Ibid.*

40 *Ibid.*, Preface, p. i.

41 See, for instance, the Mucem collections, inv. 2000.68.767.2, inv. 2000.68.767.3 or inv. 2000.68.767.4.

42 Mucem, inv. 1992.24.13, https://lescollections.mucem.org/objet?uri=http://data.mucem.org/c/168101&term=1992.24.13&object_pos=0&object_max=28.

43 Mucem, inv. 1992.24.103, https://lescollections.mucem.org/objet?uri=http://data.mucem.org/c/152181&term=1992.24.103&object_pos=0&object_max=0.

using ostrich plumes dyed in a deep russet colour. Shaved on one side and lightly curled, the worked ostrich feather forms a contrasting tail.⁴⁴

Compared to the high prices fetched by exotic bird plumage, these artificial products made colourful feathers accessible to a greater number at a fraction of the price. They also represented a virtuous alternative to the increasingly frowned upon consumption of wild plumage. As awareness around the impact of the importation of bird skins and the culling of birds grew in the West, voices rose against the excessive use of plumes in women's fashion.⁴⁵ With the establishment of the first societies for the protection of birds—in Britain, the Plumage League was founded in 1885, while America's Audubon Society dates from 1896—the sourcing of raw materials for the feather trade became a hot topic for public debate. France, where featherwork represented a sizable economic sector, was at the forefront of the defence of '*plumasserie*'.⁴⁶ The domestication of birds and bird farms were presented as means to reconcile fashion with environmental consciousness. Companies were quick to integrate this into their rhetoric. Among the advertising catchphrases found in the Cawston company literature were such mottos as 'Cawston—the name that won the Audubon'.⁴⁷ An industry-published panegyric written in 1912 in France insists on the virtuous sourcing provided by ostrich and also heron, rhea and monal farms.⁴⁸

In this debate, the craftsmanship of featherworkers and their specific transformative art were also construed as saving wild birds. James Edward Buckland argued that if the exotic plumage trade were to be stopped, 'hats will still be trimmed with feathers and ostrich feathers, artificial mounts made from a great variety of the feathers of game birds and poultry and feather trimmings that the art and ingenuity of the

44 Mucem, inv. 1992.24.102, https://lescollections.mucem.org/objet?uri=http://data.mucem.org/c/170166&term=1992.24.102&object_pos=0&object_max=1.

45 On the criticism of the excessive use of plumes, see Anne Monjaret, 'Plume et mode à la Belle Époque', *Techniques & Culture. Revue Semestrielle d'anthropologie des techniques*, 50 (2008): 228–55. See also Moore-Colyer, 'Feathered Women and Persecuted Birds'.

46 It is estimated that at the time of the British Plumage Bill in 1908, 70,000 people were employed in Paris alone in fancy feather manufacture.

47 Huntington, Cawston Archives, Box 1.

48 *Plumes et panaches. Un centenaire 1812–1912* (Paris: Société anonyme Sciana, 4 rue d'Enghein, 1912).

milliner will devise'.⁴⁹ The skill of the featherworker could transfigure an ordinary feather into an exotic one. Common birds could be 'transformed into multicoloured birds, in luxurious ornaments'.⁵⁰ The same author explains that featherworkers could imitate 'aigrettes using peacock feathers and other rare birds with the feathers of chickens, turkeys and water birds: seagulls, puffins, petrels, penguins, ducks etc'.⁵¹ 'These more common feathers are exquisitely transformed by skilful manipulation and dyes imitating nature to perfection'.⁵²

The art of feather dyeing was key in transmogrifying the domestic into the exotic. As one witness called in front of the House of Lords select committee in 1908 testified: 'I can assure you some are not birds of paradise at all: they are simply dyed feathers'.⁵³ Sometimes, 'artificial feathers', as they were called, were not even made from feathers but from other materials: 'It is the same with your egrets [...] Imitations are made from bristles and horsehair and it is done so wonderfully that it is very difficult for anyone but an expert to be able to tell you which is which'.⁵⁴

Talking about bird plumage, the author of a nineteenth-century featherworking manual commented:

feathers' colours are as bright as they are fast; they are as pleasantly variegated as they are elegantly nuanced [...] [nature] has spread over feathers the most beautiful and richest colours as well as the shine of gold and silver covered with a lustrous varnish rendering the effect even more magical.⁵⁵

Whilst a whole gamut of bright and fast colours could be achieved using the new tar-based recipes, grasping and potentially reproducing 'the lustrous varnish' of natural and in particular exotic feathers was more

49 James Edward Buckland, *The Plumage Bill in Relation to the British Empire* (London, 1913), p. 12.

50 Pierre Calmettes, *Excursions à travers les métiers* (Paris: Société d'édition et de publications Librairie Felix Juven, 1904), p. 235.

51 The same substitutive method is noted by another author: '*avec les plumes de dinde ou d'oie on imite le marabout, avec du coq ou du nandou on fait du paradis*' [marabou is imitated using turkey or goose feathers, while cock and nandou serve to imitate paradise feathers], cited in Monjaret, 'Plume et mode à la Belle Époque', p. 245.

52 *Plumes et panaches. Un centenaire 1812-1912*, p. 61.

53 *Report from the Select Committee of the House of Lords*, p. 42.

54 *Ibid.*

55 *Nouveau manuel du fleuriste artificiel*, p. 233.

difficult. In 1904, a French description of trades pictured *plumassières* composing their fashionable mounts at tables spread with feathers of various colours: 'forming a natural palette whose colours would make the artificial colours spread on the palettes of painters fade in comparison'.⁵⁶ Could the palette offered by artificially dyed feathers ever match the colours of natural feathers?

Nature's Match?

The challenges of capturing the shifting colour produced by changing light effects on surfaces had already been noted by Buffon in relation to feathers when he tried to represent birds of paradise in his plates illustrating his opus on birds: 'all these feathers are of different colours as can be seen in the plate. These colours are changing and shift with the effect of light, something the plate cannot capture'.⁵⁷

The nineteenth century had been fascinated not only by colourful feathers in general but more particularly by iridescent feathers. The shine and lustre of iridescence was especially associated with the exotic fauna of India. As such, it captured the imagination of Victorian and Edwardian Britain. Borrowing from an Indian practice, the iridescent wing cases of Buprestidae collected in Burma and India, for instance, were used as embroidery sequins on European gowns.⁵⁸ Sometimes they were used as highlights on other fashion accessories like fans or other items made from feathers.⁵⁹ Iridescent peacock feathers elicited

56 Calmettes, *Excursions à travers les métiers*, p. 240.

57 Buffon, *Histoire naturelle des oiseaux*, vol. III, p. 156.

58 Victoria Rivers, 'Beetles in Textiles', *Cultural Entomology Digest*, 2 (1994); Michelle Tolini, 'Beetle Abominations and Birds on Bonnets: Zoological Fantasy in Late Nineteenth-Century Dress', *Nineteenth-Century Art Worldwide, a Journal of 19th-century Visual Culture*, 1, no. 1 (Spring 2002), 121–34; Kena Libbes, "'Glory in a Host of Entomological Spoils": Beetle-Wing Embroidery and the Exhibition of India in Anglo-American Dress, 1780-1903', *Dress*, 2020, 79–94. See also Ariane Fennetaux, 'Les Ailes du désir. Elytres de coléoptères et mode victorienne', in *L'Insecte dans tous ses états*, ed. by Alain Montandon (Clermont Ferrand: Presses de l'Université Blaise Pascal, 2022), pp. 66–73.

59 See, for instance, late nineteenth-century fans in the collection of Te Papa Tongarewa, The Museum of New Zealand, Wellington that feature naturalised hummingbirds on a background of flowers made from feathers with scattered wing cases. Te papa Tongarewa, inv. PC001407, <https://collections.tepapa.govt.nz/object/48265> and inv. PC001408, <https://collections.tepapa.govt.nz/object/48267>.

the interest of the Pre-Raphaelites or the fashion trades as much as that of Darwin. Lady Curzon's peacock dress—which was designed by Jean-Philippe Worth, who took over as head of the Worth house after the death of his father Charles Frederick—probably best exemplifies the role of iridescent peacock feathers in the weaving together of fashion and empire in the British imagination.⁶⁰ The dress was worn by Lady Curzon at the Delhi Durbar in 1903 which her husband, then Viceroy of India, organised for the coronation of King Edward VII and Queen Alexandra as emperor and empress of India. Central to the colonial messaging of the dress, the peacock motif was rendered by the inclusion in the embroidery of jewel beetles. Iridescence captivated, but it was hard to artificially replicate.

Iridescence depended on the differing refraction of light on the surface of objects and materials. The iridescence of feathers had long been understood to be linked to an optical effect involving light. In his *Opticks*, Isaac Newton commented on how 'the finely colour'd feathers of some birds and particularly those of peacock tails, do in the very same part of the feather, appear of several colours in several positions of the eye'.⁶¹ Based on an optical phenomenon referred to by physicists as thin layer interference, iridescence is commonly found in nature, for example on butterfly wings, beetle wing cases and fish or feathers whose structural make-up allows for the optical phenomenon to take place.⁶² In bird feathers, iridescence is due to a variety of optical mechanisms, some particularly sophisticated, themselves linked to the complex and varied cell structure of barbules. Related to thin keratin films, nano-sized cells whose structure selectively reflects wavelengths, or air-

60 The dress is in the collection of the National Trust at Kedleston Hall, Derbyshire, inv. NT 107881, <https://www.nationaltrustcollections.org.uk/object/107881>. See W. Logsdail, *Portrait of Lady Curzon*, c.1909, oil on canvas, National Trust inv. 108822, <https://www.nationaltrustcollections.org.uk/object/108822> and, for a detailed view showing the use of jewel beetles, <https://nt.global.ssl.fastly.net/binaries/content/gallery/website/national/regions/peak-district-derbyshire/places/kedleston-hall/library/built-heritage-history-and-collections/embroidery-peacock-dress-kedleston.jpg?auto=webp&width=1440&crop=16:7&dpr=2>.

61 Isaac Newton, *Opticks: Or, A Treatise of the Reflections, Refractions, Inflexions and Colours of Light. Also Two Treatises of the Species and Magnitude of Curvilinear Figures* (London: printed for Sam. Smith and Benj. Walford, Printers to the Royal Society, 1704), Part III, prop. V.

62 Shuichi Kinoshita, *Structural Colors in the Realm of Nature* (Singapore: World Scientific, 2008).

filled melanosome platelets in the barbules, iridescence on feathers is a structural rather than a pigment-based colour.⁶³ It cannot easily be reproduced or imitated through the application of dyes.

In the 1908 House of Lords hearings preparing for the Plumage Prohibition Bill, the impossibility of replicating the brightness of exotic feathers by dyeing is mentioned in several testimonies. One witness, asked whether exotic feathers—in this case used for fly-tying—could be adequately replaced by domestic poultry feathers dyed in a bright colour, answered: ‘it is almost impossible to imitate them with dyed feathers [...] we have tried over and over again but have never been successful [...]’. Not ‘because the dye is not fast—Because you cannot get the same colour [...] not so brilliant, nor the same shade’.⁶⁴ Another witness, asked why it is not possible ‘to dye another kind of feather to imitate that of the real bird’ explained: ‘nature is so much better than dyeing. [...] You cannot get the same colour’.⁶⁵ The gemstone effect of iridescent Impeyan pheasants, peacocks or hummingbirds seemingly remained elusive to dyers.

The patents taken out by Parisian feather dyers in the second half of the nineteenth century are testimony to a quest for variegated colour effects, including efforts to artificially reproduce iridescence. The attempt to obtain multiple rather than uniform tints is a recurring element in the descriptions of patents. One, for instance, includes the acknowledgement that ‘up until now dyeing or painting has only managed to achieve uniform tints on these objects’.⁶⁶ Patentees explain that their process, by contrast, will enable dyers ‘to obtain various tints on the one feather’.⁶⁷ In 1878, François and Jacques Dupin, two Parisian artificial flower makers, patented a process to create iridescence artificially on both flowers and feathers. The patent describes the novelty of its process: ‘thanks to the process which will be described below we have managed to produce

63 Pascal Freyer and Doekele Stavenga, ‘Biophotonics of Diversely Coloured Peacock Tail Feathers’, *Faraday Discussions*, 223 (2020), 49–62; Geoffrey E. Hill and Kevin J. McGraw, *Bird Coloration, Volume 1. Mechanisms and Measurements* (Cambridge Mass.: Harvard University Press, 2006); Juliana Sosa et al., ‘Sexual Dichromatism of the Blue-Throated Starfrontlet, *Coeligena Helianthea*, Hummingbird Plumage’, *Journal of Ornithology*, 161 (2019), 289–96.

64 *Report from the Select Committee of the House of Lords*, p. 36.

65 *Ibid.*, pp. 35–36.

66 François et Jacques Dupin, Patent number 125306, 26 June 1878, INPI, inv. 1BB125306.

67 Jules Bour, Patent number 251950, 23 November 1895, INPI, inv. 1BB251950.

changing hues, reminiscent of those of mother of pearl and iris', by which they meant the shifting hues of iridescence.⁶⁸ Sadly, the sample attached to the patent has now been lost.

Another technique with possibly a more lasting legacy was patented in 1868 by Artus Claude Loddé, who was listed in trade directories as 'dyeing to order in all shades for featherworkers'.⁶⁹ In 1868, he patented a process which he called '*argentifère*'.⁷⁰ Interestingly, the term *argentifère*—a term still used today in the Maison Lemarié to describe a treatment received by some feathers in their archives—only refers to black feathers rather than bright and colourful ones. If feathers treated with *argentifère* do seem to acquire a metallic shine and artificially create a similar effect to the shifting light reflections of iridescence, they are all invariably black. We do not know if the treatment referred to in the Lemarié house as *argentifère* is related to what Loddé patented in 1868. Trade directories, however, similarly mention grey feathers rather than colourful ones in relation to Loddé's invention. Iridescent feathers were often described as 'metallic' in the nineteenth century: 'luxury has adorned itself in the feathers of peacocks because of their brilliant metallic lustre', as one book put it.⁷¹ Hummingbirds were also described in metallic terms: 'the feathers of these birds present the polished appearance of the most shining metals and the changing reflections of precious gemstones'.⁷² While Loddé's *argentifère* feathers may have shared something of this metallic lustre, nonetheless, being grey, they clearly did not have the gemstone effect described.

But was this ever actually the aim? The hues presented on dyed feathers and samplers, just like the names given to colours in recipe books—'bottle green', 'chestnut brown', 'plumb', 'crushed strawberries' or 'gendarme blue'—are less evocative of birds from far-flung lands than they are of familiar, western realities. The sometimes garish results and peculiarly unnatural look of some dyed feathers further imply that the dyeing of feathers was not always necessarily intended to imitate

68 INPI, inv. 1BB125306.

69 *Annuaire-almanach du commerce, de l'industrie, de la magistrature et de l'administration : ou almanach des 500.000 adresses de Paris, des départements et des pays étrangers* (Paris: Firmin Didot et Bottin réunis, 1871), p. 1322.

70 1 May 1868, INPI archives, Patent number 80740.

71 *Nouveau manuel du fleuriste artificiel*, p. 233.

72 *Ibid.*, p. 234.

nature. Was the process invented by Jules Nivette in 1886 to obtain 'marbled or dappled tints which have hitherto never been successfully applied to feathers' about imitating natural feathers, or was it pursuing an altogether different goal?⁷³ Reading some of the descriptions, it seems that dyers might have been less concerned with imitating nature than creating striking visual effects. In 1865, Gobert 'devised a means to dye the rachis of a feather in one colour and the barbules in another'.⁷⁴ While this process could have been used to obtain naturalistic effects, the drawings joined to his patent show that the intended use might have been rather different.

A series of striking colourful egrets in the collections of the Mucem illustrates how dyeing often resulted more in artificiality than in the emulation of nature's bright colours.⁷⁵ The Viol and Duflot company in Paris patented a new bleaching process in 1865.⁷⁶ Bleaching had always been important to dyeing because many feathers required some whitening before dyeing. One indication of the value attached to these processes is that the Viol and Duflot company actually sued competitors found with jars containing the nitric acid and bichromate used in their bleaching recipe.⁷⁷ The company—who were exhibitors in the Paris Exhibition of 1867 and in the 1873 Vienna World's Fair—took chemical whitening to extremes, making it, instead of a means to an end, seemingly the end in itself. A commentator reporting on the 1873 exhibition explained: 'the Maison Viol et Duflot has applied itself to producing a chemical effect in its display at the exhibition'.⁷⁸ Pushing the possibilities of bleaching and chemical dyeing, they produced some feathers that were part bleached and part natural, with others dyed two different colours and others still in a bold tricolour flag. What was

73 Jules Nivette, Patent number 175937, 5 May 1886, INPI inv. 1BB175937.

74 Gobert, Patent number, 68655, 9 September 1865, INPI inv. 1BB68655.

75 See, for instance, inv. 1992.24.29.1, https://lescollections.mucem.org/objet?uri=http://data.mucem.org/c/151054&term=1992.24.29.1&object_pos=0&object_max=3, inv. 1992.24.29.4, https://lescollections.mucem.org/objet?uri=http://data.mucem.org/c/152126&term=1992.24.29.4&object_pos=0&object_max=4, 1992.24.29.6, https://lescollections.mucem.org/objet?uri=http://data.mucem.org/c/163750&term=1992.24.29.6&object_pos=0&object_max=4 for plumes dyed in a bright green, a shocking pink and a magenta colour, respectively.

76 Viol et Duflot, Patent number 69333, 14 November 1865, INPI, inv. 1BB69333.

77 *Le Figaro*, 15 March 1869.

78 E. Louis Boeuf, *Rapport de M. E-Louis Boeuf, Délégué de l'industrie des fleurs, feuillages et plumes de Paris. Exposition Universelle de 1873 à Vienne* (Paris: Association Générale Typographique, 1874), p. 48.

displayed was a feat of synthetic artificiality, a brazen statement of mastery of chemical processes and manipulation of nature rather than an attempt to imitate its colours. Feathers dyed in different colours and now held in museums illustrate the artificial look obtained.⁷⁹

Conclusion

It is easy to see how the British feather trade contentiously extracted natural resources from the far reaches of the British Empire in response to the taste for colourful plumage in the West. As such, it was part of the 'multi-species enterprise' that was the empire.⁸⁰ During the continuing debate about the banning of exotic plumage in Britain, however, the arguments used for bird protection were no less colonial and extractivist in their outlook. In 1913, James Edward Buckland, an ardent campaigner for bird protection, wrote: 'from the trackless forests of Papua, round the world both ways, to the sugar plantations of the West Indies, the feather trade is attacking the existence of an immense variety of birds'.⁸¹ Drawing attention to the role of birds in pest control in what he called 'our insect-ridden Empire', Buckland's rhetoric pointed to the protection of sugar crops and their revenues as much as of exotic birds themselves. While this might have been a strategic argument to gain support, it nonetheless draws our attention to the complexity of the issue.

Although exotic feathers shaped chromatic tastes and expectations in the West, and synthetic dyes seemed to hold the promise of matching any colour possible, the dyeing of feathers—sometimes presented as a potentially virtuous alternative to the destructive importation of exotic plumage—was never really about imitating nature. The many examples in museum collections of colourful exotic bird plumage, including birds of paradise in particular, which were dyed black (probably for mourning) are a case in point (Figure 1.2).⁸²

79 See, for instance, an example in the collections of the Victoria and Albert Museum, inv. T.28-2021, and the feather composition with bicolour dyed feathers in the Muzeum, inv. 1992.24.17, https://lescollections.museum.org/objet?uri=http://data.museum.org/c/113187&term=1992.24.17&object_pos=0&object_max=18.

80 Antoinette Burton and Renisa Mawani, *Animalia* (Durham, NC: Duke University Press, 2020).

81 Buckland, *The Plumage Bill in Relation to the British Empire*.

82 See, for instance, examples in the University of Alberta Collections, Anne Lambert Clothing and Textiles Collection: inv. 2007.3.1 or inv. 1978.21.3. See also examples in



Fig. 1.2. Hat with millinery preparation with bird of paradise dyed black, National Museum Wales, inv. F72.373.

Turning the colourful, bright feathers of exotic birds black for western consumption, dyeing rather than representing nature, seems to serve as just another expression of the West's cultural domination.

Pure black, a colour which is not actually that common in nature, had always been a particularly difficult colour for textile dyers to achieve, requiring many stages and complex processes to obtain solid black.⁸³ The advent of tar-based dyes did not really solve the problem. Although an aniline black dye had been patented in 1863, this conspicuously did not work on animal materials such as wool or feathers. Company archives show that recipes for black were constantly tweaked and amended, revealing recurrent issues and a process that was far from standardised and controlled, relying as it did on the continued use of natural dyes. These included fustic and orchil but also indigo (produced in India), turmeric (imported from Java and Bengal) and most importantly logwood, which was imported in large quantities from the West Indies and the Americas. According to Alison Matthews David, as many as

the collections of the National Museum Wales, inv. F72.373, and in the collections of the Victoria and Albert Museum, inv. CIRC.654-1964.

83 Sophie Pitman, 'Black Color for Dyeing, and the Place of Textiles in Ms. Fr. 640', in *Secrets of Craft and Nature in Renaissance France. A Digital Critical Edition and English Translation of BnF Ms.Fr.640*, ed. by Pamela H. Smith et al. (New York: Making and Knowing Project, 2020), https://edition640.makingandknowing.org/#/essays/ann_036_sp_16.

305,000 tons of logwood were exported from the Caribbean in 1890s.⁸⁴ Logwood featured in the compositions of all the darker shades for feather dyeing, from blue to green to purple. Thus, not only was the dyeing of feathers an expression of the artificial manipulation of nature, it also itself relied on the extraction of natural resources, with the logging of logwood trees in turn impacting the natural habitat of West Indian birds.

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⁸⁴ Alison David Matthews, Colour Matters Conference, December 2023, Oxford. In Belize alone, 20,000 tons were exported annually in the 1890s. Michael A. Camille and Rafael Espejo-Saavedra, 'Historical Geography of the Belizean Logwood Trade', *Yearbook (Conference of Latin Americanist Geographers)*, 22 (1996), 77–85, p. 82.

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2. Chrome Yellow: American Mineral, American Fancy¹

Kirsten Travers Moffitt

Chrome yellow (lead chromate, PbCrO_4) was one of the most important colourants of the nineteenth century, yet its early history is vague. In 1809, the celebrated French chemist Vauquelin published synthesis procedures for lead chromate, but there has been little evidence the pigment was produced on a commercial scale or used by artists at that time.² In technical art references, starting dates vary, ranging from 1815 to 1825 or simply 'early nineteenth century'.³ For

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 - 2 Louis Nicolas Vauquelin, 'Mémoire sur la meilleure méthode pour décomposer le chromate de fer, obtenir l'oxide de chrome, préparer l'acide chromique, et sur quelques combinaisons de ce dernier', *Annales de Chimie*, 70 (1809), 70–94.
 - 3 R.D. Harley, *Artists' Pigments c. 1600–1835*, 2nd edn (London: Archetype

those invested in the study of early American fine and decorative arts, this ambiguity is inadequate. The research presented here sought to better understand the circumstances surrounding the introduction of chrome yellow, which is critically important for dating and contextualising art and artefacts from that period. This chapter relates new findings on the origins of chrome yellow, based on recent archival and documentary research and supplemented by scientific analysis of early American painted objects in the collection of the Colonial Williamsburg Foundation in Virginia. These findings demonstrate that chrome yellow was first manufactured in America in 1809, years earlier than previously believed. What follows is the fascinating, and largely unpublished, early history of chrome yellow in the United States—a product that arose from the confluence of the arts, natural sciences and industry in the burgeoning new republic. These manufacturing efforts were spearheaded by Rubens Peale, whose family are central figures in early American arts and sciences, and Sylvain Godon, a French mineralogist seeking his fortune in America. Utilising chromium ores from the Baltimore-Philadelphia region, their short-lived chrome yellow manufactory would inspire public demand for the new, brilliant yellow pigment that would eventually become invaluable to fine and decorative artists around the world.

This chapter further contextualises chrome yellow within the decorative arts movement known as American Fancy (1790–1845). Originating in England, furnishings in the Fancy style emulated forms and motifs from ancient Greece and Rome, with richly coloured surfaces that often combined gilding, imitation wood-graining and marbling, and painted ornamentation. This new aesthetic spread rapidly throughout the young United States, where it resonated with Americans and their emerging national identity as citizens of a new

Publications, 1982), p. 101; Hermann Kühn and Mary Curran, 'Chrome Yellow and Other Chromate Pigments', in *Artists' Pigments: a Handbook of their History and Characteristics*, vol. 1, ed. by Robert L. Feller (Washington, DC: National Gallery of Art, Washington, 1986), pp. 188–89; Rutherford J. Gettens and George L. Stout, *Painting Materials: A Short Encyclopaedia* (New York: Dover Publications, 1966), pp. 106–07; Nicolas Eastaugh et al., *Pigment Compendium: A Dictionary and Optical Microscopy of Historical Pigments* (Oxford and Burlington, MA: Butterworth-Heinemann, 2008), p. 231.

republic in the decades following the American Revolution.⁴ The bustling cities of Baltimore and Philadelphia became centres for Fancy painting, and chrome yellow—made from a regional ore—would become one of the style’s distinctive features. Yet few today recognise the significance of this brilliant colour and its deep associations with the geology of the region.

Chromium was discovered in 1797 by Louis Nicolas Vauquelin (1763–1829), the renowned French chemist who successfully isolated the new element from samples of crocoite (PbCrO_4), a naturally occurring lead chromate mineral first discovered in the Ural Mountains of Siberia. Vauquelin named the new element ‘chromium’ on account of the red, yellow and green precipitates he synthesised from it.⁵ However, supplies of crocoite were limited, and it was not until new chromium ores were discovered soon afterwards in the Var Provence in France that he and his associates were able to experiment more freely. Unlike crocoite, the chromium minerals from the Var mines were not chromates of lead, but rather chromates of iron, known as chromite (FeCr_2O_4). In 1809, Vauquelin published the results of his extensive experiments with chromium in *Annales de Chimie*, and this paper is generally credited as being the first to describe the synthesis of ‘chromate of lead’, or chrome yellow. However, Vauquelin’s research was heavily influenced by the work of his colleague, one M. Godon de St. Memin: a French mineralogist of great repute. Like Vauquelin, Sylvanus (Sylvain) Godon (c.1774–1840) also studied chromite and chromium extensively. By 1804, Godon had already published his research on the production of a green chromium-based pigment from chromite, for use as a pigment in oil and distemper and as a green colourant for ceramics, concluding that ‘this colour will one day furnish a great resource to our manufactories’.⁶ This was soon followed by an 1805 paper reporting his experiments to synthesise yellow lead

4 Sumpter Priddy, *American Fancy, Exuberance in the Arts, 1790–1840* (Milwaukee: The Chipstone Foundation, 2004).

5 Louis Nicolas Vauquelin, ‘Du Plomb Rouge de Sibérie et Expériences sur le Nouveau Métal qu’il Contient’, *Journal des Mines*, vi (1797), 737–60.

6 Godon-Saint-Memin, Sylvain, ‘On the Beautiful Green Colour for Painting, Which May be Obtained from Chrome’, *The Philosophical Magazine*, 20.79 (1804), 266–68 (p. 268). Originally published in *Annales du Museum National a Histoire Naturelle*, no. 21.

chromate from chromite, four years before Vauquelin's publication.⁷ Godon claimed that by precipitating an acidic solution of lead nitrate with neutral potassium chromate, shades of yellow lead chromate would result that surpassed nature and would prove important to artists, although Godon's chrome yellow does not appear to have been manufactured outside France.

Vauquelin's 1809 '*Mémoire*' would expound on Godon's earlier work, reporting that a range of coloured precipitates could be produced from adjusting variables such as temperature and pH. While neutral potassium chromate yielded an orange-yellow product, a 'deep citron yellow' was produced in acidic conditions, and alkaline solutions produced a 'fine deep red'. Vauquelin noted that the 'deep citron yellow' shade was the most stable and preferred by painters, implying that his and Godon's experiments had already generated some demand in their home country.⁸

Godon emigrated to the United States in 1807, and in that same year he was described by an American botanist as 'one of the ablest mineralogists who have ever come to this country [USA]'.⁹ His reasons for emigrating are unknown, but one source reported that the mineralogist and his family arrived in America in financial distress, suggesting that Godon sought his fortune in the New World.¹⁰ Eventually, Godon's knowledge of, and experience with, chromite would be integral to the first efforts to manufacture chrome yellow in his new country of residence. But Godon was not alone in this enterprise—his partner was Rubens Peale (Figure 2.1, left): a young man with particularly important connections to the burgeoning fields of natural science, the arts and industry in America, from which chrome yellow would emerge.

7 M. Berthollet and Louis Nicolas Vauquelin, 'Rapport Fait à la Classes des Sciences Physiques et Mathématiques de L'Institut, sur un Mémoire de M. Godon,' *Annales de Chimie*, 34 (1805), 222–29. The fact that Vauquelin is (one of) the author(s) of this paper which summarises Godon's work is likely another reason why the former is credited with the first synthesis of chrome yellow.

8 Vauquelin, '*Mémoire*', p. 94.

9 John. C. Greene, 'The Development of Minerology in Philadelphia, 1780-1820', *Proceedings of the American Philosophical Society*, 113.4 (15 August 1969), 283–95 (p. 291).

10 Rubens Peale Letterbook 1802–1814, Philadelphia, American Philosophical Society (APS), Peale-Sellers Family Collection, 1686–1963, Mss.B.P31, vol. 42. (p. 44).



Fig. 2.1. Left: Rembrandt Peale (1778–1860), *Rubens Peale with a Geranium*, 1801, oil on canvas, National Gallery of Art, accession number 1985.59.1. Right: Alexander Wilson (1766–1813), Plate VI from *American Ornithology; or, the Natural History of the Birds of the United States: Illustrated with Plates*, Volume 2, 1810, The Colonial Williamsburg Foundation, museum purchase, accession number 2018-147.1, photo by Jason Copes. Chrome yellow was identified in the blue-eyed yellow warbler, the all-yellow bird on the left.

Rubens Peale (1784–1865) was born in Philadelphia to Rachel Brewer (1744–1790) and Charles Willson Peale (1741–1827), the iconic and prolific American painter, politician, inventor and naturalist whose varied accomplishments include establishing America’s first museum and occupying leadership roles at the American Philosophical Society (APS): a learned institution promoting science and the humanities in the new republic. Rubens was one of sixteen children born to Charles, many of whom became accomplished naturalists and artists in their own right. His son Rembrandt (1778–1860) was a hugely successful portraitist, and Raphaele (1774–1825) is considered America’s first major still-life artist. Rubens suffered from poor health and especially poor eyesight, which kept him from pursuing a career in the visual arts and led him instead to explore his interests in the natural sciences and geology.

When Godon, now residing in Philadelphia, presented a series of

mineralogical lectures at the APS, Rubens was 'a constant attendant'.¹¹ As part of his instruction, Godon led pupils on weeks-long excursions to explore the geology of the region. Rubens fondly recollects these trips in his memoirs:

In early life while studying Mineralogy and Botany a number of gentleman of my acquaintance were engaged in the same pursuits, we would meet at a given point [...] from thence we would start on foot with our knapsacks, baskets, bags, hammers, trowels, &c &c according to our study & pursuits [...] we were frequently accompanied by our teacher or professors, we examined every rock & strata and plant within a circle of 20 miles around Philadelphia, these pedestrian expeditions were the means of making large and beautiful collections in the various branches of science [...]¹²

Rubens wrote that around October 1809, on an expedition with Godon, the mineralogist 'was much surprised to find such large and fine specimens of the Chromate of Iron, and when he learned that large beds of it existed in Chester Co. [Pennsylvania] and in Maryland, he suggested the idea of manufacturing a valuable pigment for artists from this Ore of Chrome'.¹³

Peale and Godon had discovered a rich chromite vein in the geologic province today known as the Piedmont Upland, about 160 miles long and 50 miles wide, stretching from Maryland to New York and encompassing the major port cities of Baltimore and Philadelphia.¹⁴ Describing the flurry of activity following their discovery, Charles Willson Peale wrote to his son Rembrandt:

Rubens has at last returned home, and intended to have wrote to you by this opportunity, but he is involved in so much labour that he cannot find time, he is about to establish a manufactory of Crome [sic] Colours. In his tour he found the ore in two places [...] Mr. Godon is his partner in the work. Rubens has built a furnace in the Printing-office & hurrying to work, so that in my next you may expect to hear more on the subject.¹⁵

11 Charles Willson Peale to Stephen Elliot, 14 February 1809, in *The Selected Papers of Charles Willson Peale and His Family*, vol. 2, part 2, ed. by Lillian B. Miller et al. (New Haven and London: Yale University Press, 1988), p. 1178.

12 Rubens Peale Letterbook, APS, Mss.B.P31 (p. 41).

13 RPL (pp. 44–5).

14 Nancy C. Pearre and Allen V. Heyl, Jr., 'Chromite and Other Mineral Deposits in Serpentine Rocks of the Piedmont Upland Maryland, Pennsylvania, and Delaware' *U.S. Geological Survey Bulletin 1081-K* (1960), 707–801 (p. 709).

15 Charles Willson Peale to Rembrandt Peale, 17 November 1809, in *The Selected Papers*

In December of 1809, Rubens leased one acre of chromite-rich land in a section of Baltimore called Bare Hills, and the two enterprising men immediately set to work producing chrome yellow. Just days before the new year, Rubens and Godon placed the following announcement in a Philadelphia paper:

CHROMIC YELLOW: Manufactured from an American Mineral [...] This beautiful pigment is now highly valued in Europe and exclusively employed when brilliancy with permanency are required. Chromic Yellow resists the action of the common air, and also all the gascious [sic] fluids arising from common acids and alkalies [sic]; it will support its fine color even when a great degree of heat is applied to it. It has a great body in painting, and may be used with Oils, Gums, or varnishes, and may be mixed with white lead, or other pigments without danger of a derangement or change of colour, therefore this yellow is of inestimable value to such artists as are desirous of transmitting their works to posterity¹⁶

The notice ran for one week and directed interested parties to 'Doctor Betton' on High Street in Philadelphia and various coachmakers for specimens. They sold their yellow at 'the Paris price', roughly \$32 per pound—an exorbitant sum considering that around this time the average skilled labourer made \$1.00 per day, with unskilled labourers taking home even less.¹⁷ Therefore, a pound of chrome yellow cost almost two months' wages for the average person, making it a luxury pigment that would have only been used in the most high-status or unique projects. Rubens and Godon defended the price, reporting that their colourant stretched further and was more vivid than other yellows.

The notice also lists the names of artists using chromic yellow, including Charles W. Peale, James Peale and Raphaëlle Peale, although it should be noted that these eminent persons were Rubens's father, uncle and brother respectively, who might have been experimenting with the new colourant partly out of curiosity as well as a sense of familial obligation. Initially, Charles was enthusiastic about the pigment, writing to an associate that his son's yellow was exceptionally

of Charles Willson Peale, vol. 2, p. 1234.

16 'Chromic Yellow: Manufactured from an American Mineral', *Poulson's American Daily Advertiser*, 26 December 1809.

17 United States. Bureau of the Census. *Historical Statistics of the United States, Colonial Times to 1970*. Bicentennial ed. Washington: U.S. Dept. of Commerce, Bureau of the Census (1975), p. 162.

brilliant and colourfast, unlike other common painter's yellows like orpiment (yellow arsenic sulphide, As_2S_3) or patent yellow (yellow lead oxychloride, $\text{Pb}_7\text{O}_6\text{Cl}_2$), and that their mine was inexhaustible, their product abundant and the ore superior to ores from France.¹⁸

Included in the list of chrome yellow users is Alexander Wilson (1766–1813), a Scottish-born poet, naturalist and illustrator with close ties to the Peale family. Wilson is best known for his richly illustrated nine-volume work *American Ornithology; or, the Natural History of the Birds of the United States*, the first three volumes of which were published from 1808 to 1811.¹⁹ The preface to the work proudly explains that the materials comprising the volumes were all produced in the United States, except the colourants. These, Wilson notes regretfully, were by necessity imported from Europe, colour being critical to this type of scientific work. But there were two notable exceptions. Wilson writes: 'In the present volume some beautiful native ochres have been introduced; and one of the richest yellows is from the laboratory of Messers. Peale and Son, of the Museum of this city [Philadelphia]'.²⁰

I conducted a technical examination of the yellows in the first three volumes of Wilson's *Ornithology* at the Colonial Williamsburg Foundation with X-ray fluorescence spectroscopy (XRF), a non-destructive technique that determines the elemental composition of a surface, allowing the presence of certain pigments to be inferred. Unsurprisingly, XRF failed to detect chrome yellow in the first volume, published in 1808. However, it confirmed the presence of lead (Pb) and chromium (Cr)—suggesting the presence of chrome yellow—in a few select yellows throughout volume two, published in 1810. One example is the bright yellow body of the blue-eyed yellow warbler from Plate VI (Figure 2.1, right). Therefore, this volume of Wilson's *American Ornithology* contains the earliest known example of Peale and Godon's chromic yellow, the first chrome yellow produced in the United States. However, analysis found that the use of chrome yellow in Wilson's work was sparse, and other yellows including orpiment, yellow ochre and organic yellow lakes were identified with more regularity throughout the volume.²¹ This minimal use of chrome

18 C.W.P. to John Isaac Hawkins, 20 December 1809, in *The Selected Papers of Charles Willson Peale*, vol. 2, part 2, p. 1244.

19 Alexander Wilson, *American Ornithology; or, the Natural History of the Birds of the United States: Illustrated with Plates*, vol. 2 (Philadelphia: Bradford and Inskeep, 1810). Colonial Williamsburg Foundation, Museum Purchase. 2018-147.2.

20 *Ibid.*, pp. vi–vii.

21 Organic yellow lakes, consisting of dyes precipitated onto inert substrates, were

yellow could suggest a scarce supply or, more likely, a reluctance to commit fully to a new pigment not yet proven to be colourfast.

As events would demonstrate, concerns about the durability of chrome yellow were not unwarranted. In February 1810, Charles wrote to Rembrandt that while he and his brother James had been using 'cromic [sic] yellow' with enthusiasm, both discovered that the pigment sometimes discoloured 'to a much darker tint than a common stone oaker', and he warned him not to use it in any of his paintings.²² Charles related that when he approached Godon with his findings, the mineralogist insisted the colour was stable. However, Godon and Rubens were unsettled enough by the news to sell their shares in the company, and their partnership appears to have ended around this time. While not entirely successful, their efforts generated enough interest that Charles wrote 'I have but little doubt that he [Rubens] will get his price, for many people have the Idea that an immense [sic] fortune is making & to be made by the Manufactory'.²³

In his memoirs, however, Rubens gave more troubling reasons for the dissolution of the business. Shortly after establishing the manufactory, Godon reportedly began to exhibit symptoms of mental illness. Rubens recounted an instance of paranoia wherein Godon was in extreme distress, convinced he was being pursued by Napoleon's spies. Godon's condition was no doubt exacerbated by financial concerns, as he shortly afterwards sold his mineral collection at auction, which must have been a devastating sacrifice to the young mineralogist. It was purchased by the Philadelphian Benjamin Smith Barton (1766–1815), a doctor of medicine and natural history, prominent APS member and colleague of the Peales. Regretfully, Godon's difficulties soon reached a boiling point. He approached Barton and demanded the return of his minerals. When the doctor refused, Godon attacked him with a carving knife. Barton escaped unhurt, but Godon was committed to an institution. 'Thus,' wrote Rubens, 'ended the chrome yellow business'.²⁴

Immediately following the failed pigment venture, Rubens turned his attentions to managing the Peale museum. He would greatly expand its artistic, scientific and anthropological collections, and would also

inferred from the absence of elements related to known inorganic yellows.

22 CWP to Rembrandt Peale, 3 February 1810, in *The Selected Papers of Charles Willson Peale*, vol. 3, p. 3.

23 *Ibid.*

24 RPL, p. 45.

offer public amusements there including music, magic lantern shows, monstrosities and mesmerism (of which he was an avid practitioner).²⁵ Despite his efforts, the museum eventually faltered, and Rubens ceased involvement around 1842. He died in 1865, managing to enjoy some years in retirement. Thanks to improved spectacles, he was also able to become an accomplished still-life painter.

Much less is known of Godon's fate. Two years after attacking Barton, Godon wrote to the APS from prison, entreating his colleagues to remember his contributions to the Society: 'it was I who pulled your collection out of the frightening chaos in which you kept your stones. It was my work that gave them the luster and the usefulness they present today'.²⁶ He reminds them that he is not the only Society member to have experienced financial difficulties, and insists he holds no ill will towards the organisation.²⁷ Despite his tragic circumstances, Godon maintained his faith in the APS mission: 'During my time in prison, I have often thought of the Society, not for the advantages it has given me, but for those it can offer to the civilization of the new world'.²⁸ Sadly, there are no records of Godon's further scientific contributions after 1812, and this once promising mineralogist died in obscurity in 1840. Despite the unfortunate conclusion of their partnership, Peale and Godon set the stage for chrome yellow's bright future.

Throughout the 1810s and 1820s, chrome yellow slowly gained a foothold in the flourishing American market for artists' colours. Studies of newspaper advertisements from this decade show that announcements for 'the newly discovered pigment called Chromic yellow' appeared with greater frequency, often emphasising its source from an American mineral and encouraging consumers to consider products sourced and made in the USA over their British and European counterparts.²⁹

This public enthusiasm for American goods was common in the

25 Lee Alan Dugatkin, *Behind the Crimson Curtain: the Rise and Fall of Peale's Museum* (Louisville, Kentucky: Butler Books, 2020). In addition, the Rubens Peale Letterbook at the APS contains many pages relating his experiments with mesmerism.

26 Silvain Godon to APS, 11 December 1812. American Philosophical Society Archives.

27 Godon's comment may have been directed at Dr Barton, who allegedly mishandled Royal Medical Society of Edinburgh funds while president of that society, <https://archives.upenn.edu/exhibits/penn-people/biography/benjamin-smith-barton/>.

28 Letter from Godon to APS. American Philosophical Society Archives.

29 'Brilliant Yellow, The Newly Discovered Pigment, Called Chromic Yellow', *Federal Gazette*, Baltimore, Maryland, 14 March 1812.

years leading up to and after the American Revolution (1775–1783), when independence from foreign imports was actively promoted to strengthen the young nation's economy. Products derived from America's abundant resources, such as chrome yellow from chromite, also represented the natural bounty of the expanding American landscape and were further celebrated for this reason. In this period, the developing fields of chemistry and geology saw expansive growth which held great promise for industrial progress. These efforts were all considered vital to America's economic prosperity and necessary for converting the country's natural resources into consumer products. The convergence of these sentiments was perhaps best expressed by Alexander Wilson in his 1810 preface to *American Ornithology*, one of the earliest works to use chrome yellow:

the whole materials and mechanical parts of this publication have been the production of the United States, except the colors [...] it is not without regret and mortification he is obliged to confess, that for these he has been principally indebted to Europe. The present unexampled spirit, however, for new and valuable manufactures, which are almost every day rising around us; and the exertions of other intelligent and truly patriotic individuals, in the divine science of Chemistry, give the most encouraging hopes, that a short time will render him completely independent of all foreign aid; and enable him to exhibit [...] his subjects in colors of our own.³⁰

In this context, chrome yellow can be placed at the intersection of art, science and industry during a transformative period in American history. However, while its use in early American decorative arts initially reflected support for these emerging movements, its explosive success can be primarily attributed to its brilliant yellow colour.

Shortly after the closure of Peale and Godon's chromic yellow manufactory in Philadelphia, the team of Chilton and Jarvis began to manufacture the pigment using ores from Chester County Pennsylvania, where Peale and Godon had first encountered chromite. George Chilton (1767–1836) was an accomplished analytical chemist based in New York City, and one of the pre-eminent makers of scientific instruments in the United States.³¹ It is unclear how Chilton first encountered John Wesley

³⁰ Wilson, *American Ornithology*, p. vi.

³¹ Wyndham D. Miles and Robert F. Gould, *American Chemists and Chemical Engineers*,

Jarvis (1780–1840), an artist on the rise to become New York's premier portraitist, known for his flashy dress and spirited nature.³² Jarvis travelled extensively to paint his elite and wealthy clients, working exclusively in Baltimore during the years of his partnership with Chilton. It was Jarvis who first approached the chemist about making chrome yellow, and the pair opened their manufactory in 1811, with Chilton chiefly credited (without mention of Jarvis) by many chemical historians as being the first to manufacture the pigment on a commercial scale.³³ Advertisements for Chilton and Jarvis's 'chromic yellow' first appear in March 1812, specifying that the pigment is manufactured in New York but sold in Baltimore.³⁴ Like Rubens and Godon, their manufactory was short-lived. With the outbreak of the War of 1812, Chilton commenced management of a gunpowder factory in New Jersey, and Jarvis turned his attentions to his skyrocketing painting career.

In 1812, more advertisements for 'chromic yellow' appeared in New York, Philadelphia and Baltimore newspapers, suggesting that by this time others were synthesising the new pigment. These efforts were likely encouraged when William Hembel, a Philadelphian chemist, published a new method for manufacturing the pigment that same year.³⁵ Hembel's efforts were noteworthy in that he overcame challenges in its preparation (namely, expelling the carbonic acid from the alkali, which Hembel believed was responsible for the darkening) and succeeded in producing a bright, pleasing yellow. However, even Hembel declined to guarantee his pigment's permanency.

vol. 2 (Connecticut: Gould Books, 1997), pp. 43–44.

- 32 According to a note in the Georgetown University Archives (Booth Family Center for Special Collections, Henry Hunt-William Chilton collection, Series II, Box 6, Folder 4), Jarvis painted a portrait of George Chilton, but I have been unable to locate this painting.
- 33 William Haynes, *American Chemical Industry: Background and Beginnings*, vol. 1. (New York: Van Nostrand, 1954), p. 155. In this same source, Godon is credited as being the first to make chrome yellow in America, albeit in small portions for specimen cabinets (*ibid.*). Another source reports that Chilton was making chrome yellow as early as 1808, but I have not encountered any evidence to support this date (Miles and Gould, *American Chemists*, p. 43).
- 34 'Brilliant Yellow', *Federal Gazette*, 14 March 1812. Some later advertisements list the manufacturers as 'Clinton and Jarvis', which I believe is likely a typographical error.
- 35 William Hembel, letter to Thomas Cooper, published as 'Chromat of Lead' in *The Emporium of Arts and Sciences*, 3: 2 (August 1814), 305–09. This same volume contains another detailed description of the synthesis of lead chromate from chromite on pp. 264–65.

For the next several years, advertisements for chrome yellow remained sparse but continued to promise permanence and durability. One manufacturer, William Palmer of New York, whose chrome yellow advertisements would run until 1820, reported that he had succeeded in making chrome yellow permanent 'after numerous and expensive experiments'.³⁶ It is evident from these and other first-hand sources that concerns about the stability of chrome yellow lingered in the period following its introduction, suggesting that the pigment did not immediately supersede other yellows and acceptance was more gradual than was previously believed.

Another likely reason for its slow acceptance was the expense. Although the price decreased dramatically from Peale and Godon's initial \$32 per pound in 1809 to \$1.00 per pound by 1824, chrome yellow was still relatively expensive.³⁷ Listed at \$1.25 per pound in 1821, it was still seven times more costly than the more traditional patent yellow, selling at 18 cents per pound.³⁸

Despite its cost, demand for chrome yellow slowly grew. An 1815 advertisement for the sale of painters' colours in Connecticut lists ten pounds of chromic yellow available for sale, as opposed to 175 pounds of king's yellow (orpiment) and 500 pounds of patent yellow.³⁹ Just seven years later, another notice listed 250 pounds of both chromic and king's yellow for sale, suggesting that both pigments were in equal demand by this time.⁴⁰

While supply and demand for chrome yellow increased throughout the 1810s and into the late 1820s, traditional inorganic yellows like patent and king's yellow remained strong competition for the new yellow pigment. An analysis of the frequency of the terms 'chrome yellow', 'patent yellow', 'king's yellow' and 'orpiment' in American newspapers in the period of 1810 to 1860 found that chrome yellow's final blow to other traditional yellows occurred c.1827, and that by the 1830s it was the

36 'Fine Colors', *New York Gazette* (27 October 1814).

37 Contracts for the year 1824, Communicated to the Senate, 5 January 1825. American State Papers 023, Naval Affairs vol. 1, pp. 1024–31. Publication no. 251.

38 Contracts for the year 1821, Communicated to the Senate, 23 January 1832. American State Papers 023, Naval Affairs vol. 1, pp. 760–85. Publication no. 205.

39 'Issac D. Bull', *Connecticut Courant*, Hartford, Connecticut (12 August 1815).

40 'William H. Imlay & Co., Dye Stuffs, Paints, & c.', *American Mercury*, Hartford, Connecticut, 15 April 1822. This notice specifically lists 'chromic yellow, no. 1, 2, 3', indicating that multiple shades of yellow were in production.

dominant yellow pigment, with the others hardly mentioned after that date.⁴¹ These findings are critical when setting chrome yellow within the context of cultural heritage. They suggest that due to the scarcity and relative expense of this pigment before c.1827, chrome yellow was more likely to be found in the fine arts or on decorative objects, but less likely to have been used in more common applications where large amounts were required, such as house paint.

The eventual dominance of chrome yellow was a result of the rediscovery and exploitation of the Piedmont Upland chromite vein by Isaac Tyson (1792–1861), a Quaker businessman who would industrialise the production of lead chromate from chromite, bringing what would come to be known as ‘Baltimore Chrome Yellow’ to the world. Tyson was born and raised on a farm in Bare Hills Maryland, the same area where Peale and Godon had mined chromite in 1809 (and while there is no record of their meeting, it seems a tantalising possibility). As a young man, Tyson was an avid student of mineralogy and chemistry, and aware of the chromium-rich minerals on his family’s property, already mining chromite as early as 1817.⁴² However, it was not until a decade later that Tyson would make a fortuitous discovery that led to the industrialisation of chrome yellow:

in the summer of 1827, Isaac Tyson Jr., saw in a Belaire market, at Baltimore, a cart containing a cider barrel, held from rolling about by means of some heavy black stones. They consisted of chrome iron ore; and the knowledge necessary to identify them was at that time confined perhaps to young Tyson, who happened to see them. He had made a study of them in their first known American locality—that of the Bare Hills near his father’s residence—then six miles north of the city. He had also studied chromium compounds in the early French literature on the subject, and had possessed himself of about all the available knowledge thereon. These stones had been taken from the surface of a farm in Harford county [Maryland], 27 miles north-eastward from the city.⁴³

Tyson was uniquely suited to recognise the enormous size and potential

41 Synonyms for all of these pigments were included in the search.

42 Pearre and Heyl, ‘Chromite’, p. 731.

43 M.E. Fritz Cirkel, *Report on the Chrome Iron Ore Deposits in the Eastern Townships Province of Quebec* (Ottawa Government Printing Bureau, 1909), p. 4.

of the Piedmont Upland deposit, and ‘much like a master chess player’, he aggressively leased or purchased lands where he or his surveyors discovered chromite.⁴⁴ The Tyson record book at the Maryland Center for History and Culture contains hundreds of deeds and contracts relating to Tyson’s purchase of land containing chrome ore, from Virginia to Vermont.⁴⁵ This influx of chromium would flood the world market with chrome yellow. In 1845, Tyson established the Baltimore Chrome Works in Fells Point, Baltimore, and commenced production of the chrome yellow pigment at his factory. In this period, chrome yellow was often referred to in advertisements as ‘Baltimore Chrome Yellow’. However, by this time, Tyson was extracting chromite from mines all over America, and Tyson’s Chrome Works would monopolise the chrome yellow market until 1880.⁴⁶

As a complement to the historical research carried out for this essay, the materiality of American chrome yellow was explored through the technical analysis of painted objects dating from the first half of the nineteenth century in the Colonial Williamsburg collection. Although chrome yellow pigment was used on various objects ranging from easel paintings to house paints in this period, furnishings painted in the style known as American Fancy were chosen for this analysis for two reasons. First, because vivid colours were a distinctive characteristic of American Fancy painting, where bright yellow could be used alone, in mixtures to create deep greens or, most often, as a thin, brilliant yellow stripe to offset richly painted surfaces. Second, the cities of Baltimore and Philadelphia—the same regions from which chromium was mined—were major centres for Fancy painting, suggesting a previously unrecognised link between geography and the prominent use of chrome yellow in the American Fancy aesthetic. Fifteen furnishings with yellow or green paints were analysed; see Table 2.1 for more information.⁴⁷

44 Robert C. Smith, III and John H. Barnes, ‘Geology of Nottingham County Park’, *Commonwealth of Pennsylvania Department of Conservation and Natural Resources, Bureau of Topographic and Geologic Survey* (1998), p. 15.

45 Record Book of Isaac Tyson (1826–1849), Maryland Center for History and Culture, H. Furlong Baldwin Library, MS 863.

46 Pearre and Heyl, ‘Chromite’, p. 731.

47 All objects can be viewed on the Colonial Williamsburg Foundation online collection, <https://emuseum.colonialwilliamsburg.org/groups>.

Table 2.1. American Fancy Painted Furnishings from the Colonial Williamsburg collection Selected for Analysis

Accession number	Title	Date/Region
2004-115	Side Chair	1815/Baltimore, Maryland
1981.2000.9	Bamboo-Turned Side Chair	1815-1820/New England
2022-29	Box	1815-1825/Delaware or Maryland
2008.2000.3	Rocking Chair	1815-1830/Maine or New Hampshire (possibly)
2003-1,1A	Couch	1819-1821/Baltimore, Maryland
2003-1,2	Pier Table	1819-1821/ Baltimore, Maryland
2003-1,4-7	Side Chair	1819-1821/ Baltimore, Maryland
1994-108,1	Side Chair	ca. 1820/Baltimore, Maryland
1988.2000.1	Windsor Writing-Arm Chair	ca. 1820/Virginia (probably)
1974.2000.1,1	Side Chair	ca. 1820/New York
1973.2000.1	Painted Windsor Side Chair	ca. 1820/New Hampshire, New Ipswich
1980.2000.1,1	Side Chair	1820-1840/Pennsylvania (probably)
1963.2000.1	Grained and Painted Settee	1825-1840/New England (probably)
1972.2000.6,2	Side Chair	1830-1845/New England or New York
1972.2000.4,2	Side Chair	ca. 1835/Virginia (probably)

Analysis was primarily conducted with XRF, as for Wilson's *Ornithology*, as it is a non-destructive method that can rapidly detect the presence of chromium and lead in yellow or green paint, thus suggesting the presence of chrome yellow. In order to gather further information on paint layers and pigments, small samples were collected from discrete areas for additional methods, including cross-section microscopy, polarised light microscopy (PLM) and scanning electron microscopy-energy dispersive spectroscopy (SEM-EDS). When combined, these multiple approaches yielded rich information on the use of, and variation within, chrome yellow in Fancy furnishings in the critical years following its introduction through the mid-nineteenth century. During this research, it was noted that these chrome yellow paints still maintain their original brilliant yellow colour, suggesting that the early discolouration was not as widespread as previously reported.⁴⁸

48 Recent studies into the degradation of chrome yellow (in select works by Van



Fig. 2.2. Top left: Hugh and John Finlay, Side Chair, Baltimore, 1815, The Colonial Williamsburg Foundation, museum purchase, accession number 2004-115, photo by Jason Copes. Top right: paint cross-section from chair at left, reflected visible light, 400x, The Colonial Williamsburg Foundation, photomicrograph by Kirsten Moffitt. The light yellow base coat at the bottom is made with lead white and yellow ochre, while the uppermost finish coat is chrome yellow, a resourceful use of what was an expensive pigment at that time. Bottom left: detail of yellow striping on a grained and painted settee, probably from New England, 1825–1840, The Colonial Williamsburg Foundation, museum purchase, accession number 1963.2000.1, photo by Jason Copes. Bottom right: scanning electron microscope backscatter electron image of a pigment sample from the yellow painted striping from settee on the left, 6200x, The Colonial Williamsburg Foundation, photomicrograph by Kirsten Moffitt. Distinct rod-shaped particles of chrome yellow are observed, some measuring up to ten microns in length.

Gogh and his contemporaries) suggest that the presence of sulphates coupled with ultraviolet radiation are responsible for the observed darkening. Summarised in Vanessa Otero, Joana V. Pinto, Leslie Carlyle, Márcia Vilarigues, Marine Cotte, Maria J. Melo, 'Nineteenth Century Chrome Yellow and Chrome Deep from Winsor & Newton', *Studies in Conservation*, 62.3 (2017), 123–49 (p. 124).

At the time of writing, Colonial Williamsburg's earliest Fancy-painted furnishing with a solid date following the introduction of chrome yellow is a side chair (Figure 2.2, top left)—one of a set of twelve made in 1815 by the workshop of Hugh and John Finlay, pre-eminent Fancy furniture makers in Baltimore during this period, when the city boasted no fewer than thirty-seven Fancy chair manufacturers.⁴⁹ Painted yellow overall, with delicate brown and white striping, the chair features a square caned seat (shown here with a reproduction tasselled cushion) and painted decorations inspired by classical motifs.

Figure 2.2 (top right) shows the resulting paint cross-section from the yellow side chair magnified 400x, indicating that the decoration is comprised of two distinct layers. The preparatory layer at the bottom consists of a thicker light-yellow coating (which appears white at this magnification). This contains no chrome yellow, but does contain the less expensive pigments lead white ($2\text{PbCO}_3 \cdot \text{Pb}(\text{OH})_2$) and yellow ochre ($\text{Fe}_2\text{O}_3 \cdot n\text{H}_2\text{O}$). Over this inexpensive base coat is a thin layer of solid chrome yellow paint, applied to the entire surface. At this time, chrome yellow sold for approximately \$5 per pound, so its relegation to only the uppermost finish layer here, over a less expensive ochre-based yellow, suggests an awareness on the part of the craftsman regarding the expense of chrome yellow, and a need to conserve the supply.

Artisans such as the Finlay workshop produced similar all-yellow Fancy furnishings around this same period, suggesting a vogue for the new colour which was increasingly available yet still prohibitively expensive to all but the wealthiest clients. One object that retains its original chrome yellow paint is a vivid yellow Klismos-style side chair (1815–1820) at the Metropolitan Museum of Art (65.167.6).⁵⁰ Here, the generous use of chrome yellow was an eye-catching demonstration of the owner's wealth, and likely reflected support for products sourced

49 William Voss Elder III, *Baltimore Painted Furniture 1800–1840* (Baltimore: The Baltimore Museum of Art, 1972).

50 To view images of the MMA chair, visit www.metmuseum.org/art/collection/search/1815. Analysis of this chair detected chrome yellow. See Rian M.H. Deurenberg, 'Examination and Treatment of a Set of Klismos Chairs, Attributed to John and Hugh Finlay', *Journal of the American Institute for Conservation*, 47.2 (2008), 97–117 (p. 105).

and produced in America—an increasingly important aspect of early consumerism in the new republic.

An entire suite of furnishings dating from 1819 to 1821, attributed to the Finlay workshop and currently in the Colonial Williamsburg collection, consists of a Grecian-style *recamier* couch (2003-1,1A), a pier table (2003-1,2) and four Klismos-style side chairs (2003-1, A-D). Each piece is grain-painted to imitate rosewood, with painted, gilt and glazed Grecian motifs and very thin yellow striping contouring the surfaces. Analysis of the yellow stripes confirmed the presence of chromium and lead, while PLM shows that pigment particles exhibit unique characteristics that distinguish chrome yellow from other inorganic yellows under the microscope: namely, a strong yellow-green hue of the particles in transmitted light and an elongate, rod-like morphology. The Finlay couch yellow rods measured approximately 1–2 μm in length, but this study found that the length of chrome yellow particles can vary widely depending on the object.

For comparison, the chrome yellow stripe on a grained and painted settee dating 1825–1840, possibly from New England (1963.2000.1), was examined. This settee, like the Finlay suite, features grain-painting in imitation of rosewood with a chrome yellow stripe (Figure 2.2, bottom left). Imaged with the scanning electron microscope, the distinctive chrome yellow rods (Figure 2.2, bottom right) measure approximately 10 μm —much longer than those from the Finlay couch. These two examples, the Finlay couch and the New England grained settee, represent the typical variation in particle length for chrome yellow I have observed through years of pigment analysis on fine and decorative art objects. Thus far, no correlation has been identified between the morphology of chrome yellow under the microscope and the date of an object, although this was not the intent of this research. These differences more likely reflect variations in the chemical techniques used to manufacture the pigment, which persisted throughout the nineteenth century as chrome yellow's brilliant hue remained in high demand.⁵¹

51 The Winsor & Newton nineteenth-century archive contains 183 different recipes for producing three shades of chrome yellow. See Otero et al., 'Chrome Yellow'.

Conclusion

To conclude, this research has demonstrated that chrome yellow was first produced commercially in America in 1809, born of a previously unknown partnership between Rubens Peale—a native-born Philadelphian, natural scientist and member of the renowned Peale family of artists and scientists—and Sylvain Godon—an accomplished mineralogist from France. Godon's name has faded into obscurity, yet he, perhaps even more than his esteemed colleague Vauquelin, deserves credit for his contributions leading to the introduction of this vastly important pigment, which he first synthesised in France in 1805. Four years later, Peale and Godon's short-lived chrome yellow manufactory in Philadelphia utilised the abundant chromite ores they discovered in the Baltimore-Philadelphia region, and their efforts supplied local artists and craftspeople with the new brilliant yellow pigment. In the years following Peale and Godon's short-lived venture, others attempted to manufacture chrome yellow, but efforts were sporadic and its acceptance was slow. For almost two decades, it was relatively expensive and rare, which should be considered when contextualising art and artefacts from this period. Traditional yellow pigments like orpiment and patent yellow remained strong competition during this time, but chrome yellow eventually surpassed them around 1827 following the industrial extraction of American chromite from the Piedmont Upland deposit by Isaac Tyson. Soon after, Tyson's 'Baltimore Chrome Yellow' would flood the global market with this vivid colour, made from an American mineral.

This documentary research was complemented using a relatively modest technical study of Fancy-painted furnishings in the Colonial Williamsburg collection to explore the materiality of chrome yellow, which holds a distinctive place in that uniquely American aesthetic movement. High-status Fancy workshops, especially those in the Baltimore-Philadelphia region where chromite was mined, were quick to embrace the new pigment and used this brilliant colour to great effect for an elite client base for whom no expense was spared. As Fancy painting evolved and was embraced by the middle class, chrome yellow—whether used all over or relegated to a thin stripe—symbolised support for American enterprise and industry, and celebrated the rich natural resources of the new nation.

Analytical Techniques

XRF analysis was conducted with a Bruker Tracer III-V+ portable XRF device with a rhodium (Rh) target and Si-Pin detector with the following parameters: 40 kV, 3.6 μ A, no vacuum, no filter, 20 second duration. Spectra were collected with S1PXRF v.3.8 software and processed with ARTAX v. 7.4.0.0 software.

Cross-section microscopy entailed embedding a small (≤ 1 mm) paint sample in a cube of clear synthetic resin, followed by careful polishing to expose the paint layers, which were then examined and photographed with a Nikon Eclipse NiU microscope from 100–400x magnifications under visible and ultraviolet light conditions (EX 380–330 nm, BA 420 nm). Digital images were captured using a Nikon DS-Ri1 microscope camera with Nikon NIS Elements (BR) software v.5.20.01.

Polarising light microscopy involved the collection and examination of dispersed pigment particles from the target paint using transmitted plane- and cross-polarised light to assess the optical and morphological properties of the particles which assist in their identification. This involved the same microscope and photo setup as for cross-sections, with the additional use of an oil-immersion lens for 1000x magnification.

SEM-EDS was applied to both cross-sections as well as ‘loose’ powdered pigment samples to determine the elemental content of target layers or pigment particles at much greater magnifications than optical microscopy alone. A Phenom ProX desktop scanning electron microscope with a CeB_6 source and Phenom ProSuite software v. 2.8.2 and ProX EDS Elemental Identification software v. 4.5.5 were used.

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3. Wavelengths and Potato Starch: The (Im)material in Colour Photography

Nathalie Boulouch

Considered sorely lacking when photography was first invented, the reproduction of colour was a key subject of research during the nineteenth century. The turn of the century can be seen as a turning point. In 1891, the French physicist Gabriel Lippmann (1845–1921) invented a colour photography process based on the recording of wavelengths, known as interference heliochromy or interferential photography. In 1907, a new and revolutionary process, the Autochrome, was brought to market by the Lyon-based manufacturers of photographic materials, Auguste (1862–1954) and Louis Lumière (1864–1948).

The two processes recorded colour in totally different ways. While Lippmann proposed a way of capturing colours as a physical phenomenon, with a photographic technique that required no materiality of pigments or dyes, the Lumière brothers used dyed potato starch granules to reproduce colours by additive synthesis. But while the methods for recording colours differ between these two techniques, they share a common means of visualisation. As material, three-dimensional objects, interferential photographs and Autochromes exist as images through the effect of reflected or transmitted light, which produces an immaterial and ephemeral image, usually via projection. It is this tension between materiality and immateriality in the history of early colour photographs that will be discussed in this chapter. This tension was arguably one of the contributory factors to how the arrival of colour photography was critically evaluated as a technological innovation at the turn of the century.

Wavelengths and Potato Starch

From the outset, the quest for colour was central to the history of photography. When the very first daguerreotypes were displayed in Paris in 1839, the eminent German scientist Alexander von Humboldt—who had been appointed alongside Jean-Baptiste Biot and François Arago to evaluate the process—described it as one in which ‘objects draw themselves with inimitable fidelity’, where ‘light [is] forced by chemistry to leave, in a few minutes, lasting traces, to clearly delineate contours down to the most delicate parts’ so that we are able to ‘see all this magic (in all honesty, a magic without colour!)’.¹ In the quest for mimicry of the real world within photography, this discovery of a ‘barrier created by the very nature of the new process’,² in the words of the French scientist Joseph-Louis Gay-Lussac, revealed a ‘problem’—the term recurred throughout the debates of the nineteenth century—to which a solution had to be found.

At the end of the seventeenth century, Isaac Newton’s experiments with prisms demonstrated that colours are already present in white light. In the nineteenth century, scientists looking for colour in photography concentrated their initial efforts on searching for a photosensitive substance whose properties could record all the colourations within the light spectrum. In 1848, the French scientist Edmond Becquerel (1820–1891) discovered a process based on photochemistry, which allowed him to obtain the first coloured images of a luminous spectrum and then images of objects in their correct colours. A few decades later, Lippmann built on this work to develop a method for reproducing colours ‘directly’.³

As a professor of mathematical physics at the Sorbonne and member of the physics department of the Académie des sciences in Paris since 1886, Lippmann was involved in contemporary debates on the nature of light and initially wanted to demonstrate the wave theory of light advanced by Augustin Fresnel a few decades earlier. On 2 February 1891, he submitted his results to his colleagues and thereby revived the hope of making a

1 Letter of 7 February 1839 to the Duchess Friederike von Anhalt-Dessau, reproduced in *Antigone*, 14 (1990), 9. All translations from French are my own.

2 ‘Rapport fait à la chambre des pairs par Gay-Lussac à la séance du 30 juillet 1839’, in *An Historical and Descriptive Account of the Various Processes of the Daguerreotype and the Diorama by Daguerre*, ed. by Beaumont Newhall (New York: Winter House Ltd., 1971), p. 33.

3 Cf. Sylvie Pénichon, *Twentieth Century Colour Photographs. The Complete Guide to Processes, Identification & Preservation* (London: Thames & Hudson, 2013), pp. 4–19.

photograph using a method that captured, sealed and reproduced every colour of each ray of light. His first image was a solar spectrum: a perfect and instantly recognisable scientific motif. But Lippmann quickly realised that his invention would only make sense if it could record the colours of natural objects. Having improved his technique as a photographer, he presented his first four photographs of objects to the Académie des Sciences on 25 April 1892: a stained-glass window with four colours, namely red, green, blue and yellow; a group of flags; a dish of oranges topped with a red poppy; and a multicoloured parrot.

Using glass plates coated with very thin albumen or gelatin emulsion containing extremely fine grains of silver halide, his technique could reproduce the colours of visible light—wavelengths between 400 nm [nanometres] (blue) and 700 nm (red)—by recording standing waves formed by the interference of direct and reflected light. In other words, the wavelengths (each corresponding to a colour) were stored inside the sensitive layer. After processing, the silver emulsion contained a series of metallic silver planes spaced at regular intervals that had been formed by these standing waves. Each set of planes corresponded to a specific wavelength, or colour. Finally, a prism with a 10-degree wedge angle was cemented with Canadian balsam to the finished emulsion to improve visibility. A black varnish was then applied to the back of the image.⁴

An interferential photograph was therefore an object with a specific shape, thickness and weight. It was closer to the daguerreotype of early photographic times than to the paper prints that were widespread at the end of the nineteenth century. Held in the hand, it was a rather unimpressive, colourless image. But when the photograph was exposed at an appropriate angle to a white light source, all the incident rays of light were transmitted through the emulsion. They were reflected back toward the viewer, who was able to perceive colours because of the reflected rays of light shaped by the wavelength imprint encapsulated in the silver emulsion. The image then suddenly appeared in a shining display of intense colour. It was therefore preferable to use special devices such as an individual viewing apparatus or, even better, optical lanterns allowing the megascopic projection of opaque objects.

The most fascinating thing about the Lippmann photographic technique was that it did not require any pigments or dyes to render

4 Alphonse Berget, *Photographie des couleurs par la méthode interférentielle de M. Lippmann* (Paris: Gauthier-Villars, 1891).

colour. That is why Lippmann was able to assert: 'the image will remain permanently *fixed* and can be observed in full daylight without fading over time'.⁵ This was one of the arguments put forward by his fellow members of the French Académie des sciences in their letter nominating Lippmann for the 1905 Nobel Prize. They stressed the superiority of Lippmann's process over other inventions based on three-colour processes, which used opaque support and pigment colours, arguing that interferential photographs 'have nothing in common with photographs coloured by the juxtaposition of colour tones, which can only approximate natural tones'.⁶

In 1908, the Nobel Prize in physics was awarded to Lippmann following a controversial debate.⁷ While nominating the invention based on the fact that it was a breakthrough method for recording permanent photographic colours, the committee above all celebrated Lippmann's brilliant confirmation of the wave nature of light, which had been a goal of his from a very early point in his career.

In his speech, the president of the Royal Academy of Sweden highlighted the characteristics of the invention: 'The effect of colour in Lippmann's experiments does not therefore arise from pigment colours. We have to do with what are called virtual colours'.⁸ Indeed, because they are purely the result of a physical (and not chemical) record, interferential colours have no materiality: instead, they are like ephemeral hues on soap bubbles or standing waves in a thin oil film on wet asphalt.

In contrast to the immateriality of colour in Lippmann's process, the Autochrome's singularity relied on 'the very personal idea of using a material grain'.⁹ In this case, microscopic granules of potato starch. Although it can be linked to the development of the so-called 'three-colours screen processes' introduced into photography in the 1890s, the idea of the 'grain' takes up a statement left at the theoretical stage since 1862 when it was made by Louis Ducos du Hauron (1837–1920), inventor

5 Gabriel Lippmann, 'La photographie des couleurs', *Comptes rendus hebdomadaires des séances de l'Académie des sciences*, T. 112 (1891), 274–75 (p. 274).

6 Letter from E. Bouty and H. Pellat dated 20 January 1905 (proposal for the Nobel Prize in Physics), in *Registers of the Swedish Academy of Sciences* (1905), 133–34 (p. 134).

7 Gabriel Lippmann was chosen over Max Planck.

8 Archives of the Swedish Academy of Sciences, Stockholm, 10 December 1908, <https://www.nobelprize.org/prizes/physics/1908/ceremony-speech/>.

9 Etienne Wallon, 'La photographie des couleurs et les plaques autochromes', Conférence faite devant la Société française de photographie le 27 juin 1907, 15 (1907), 336–58 (p. 350).

of a trichromatic method of colour photography: the sieving of the three simple colours is accomplished no longer by means of coloured glass, but by means of a translucent sheet mechanically covered with a grain of three colours.¹⁰ Ducos du Hauron was inspired by the French chemist Michel Eugène Chevreul's observations on optical mixing published in 1839 in his seminal book *De la loi du contraste simultané des couleurs, et de l'assortiment des objets colorés, considéré d'après cette loi* [*On the Laws of Contrast of Colour and Their Application to the Arts*], wherein he had demonstrated that lines or dots of colour placed closely together could be blended by the eye and brain.

After having been involved in Lippmann's research since 1892, the Lumière brothers decided in 1895 to change the course of their research. Considering the technical obstacles to successful industrial production of the Lippmann process, they decided to explore the 'indirect' method of colour photography initiated by Louis Ducos du Hauron and Charles Cros (1842–1888) in 1869. This was based on the idea that three appropriately chosen primary colours can recreate all the others. The Lumière brothers finally patented their invention on 17 December 1903. Four years later, the Autochrome was brought to market as the first industrial photographic process to reproduce natural colours.

It was a screen-plate process. The screen consisted of very fine grains of potato starch tinted with aniline dyes in blue-violet, green or red-orange, and mixed in such proportions as to produce a uniform grey layer. The mixture was dusted onto a glass plate coated with a sticky varnish. Interstices between the grains were filled by dusting black carbon particles over the screen. The plate passed through a high-pressure rolling press, which laminated the grains of starch and increased the transparency of the screen. After exposure in the camera, the plate was processed in regular reversal black-and-white chemistry to produce a positive. The finished plate was then coated with a varnish and protected by a glass cover. The two glass plates were then sealed together with a sticky strip of black paper. The image was a positive transparency and it was unique.¹¹

The potato starch granules acted as filters on two occasions. First,

10 Louis Ducos du Hauron, 'Solution physique de la reproduction des couleurs par la photographie', in *La Triplique photographique des couleurs et l'imprimerie*, ed. by Alcide Ducos du Hauron (Paris: Gauthier-Villars, 1897), pp. 457–59.

11 Cf. Jean-Paul Gandolfo, Bertrand Lavedrine, avec la collaboration de Christine Capderou et de Ronan Guinée, *L'Autochrome Lumière : secrets d'atelier et défis industriels* (Paris: CTHS, 2009).

as the picture was taken, when the light coming into the camera had to pass through the coloured screen before the image was recorded in the silver emulsion. Second, when the positive plate (slide) was backlit, as transmitted white light passed through the glass plate composed by the coloured filter mosaic and the recorded image in black and white. Colours were recreated by the observer using additive synthesis. For example, white did not exist in the coloured screen. It was recreated by mixing rays coming through the red, blue and green starch granules.

Shining a Light

Although the ways in which the colours were recorded differed across the two methods, Lippmann plates and Autochromes shared the characteristic of producing only positive originals. Another similarity was their need to use an optical device for good display and disclosure. As the photographer Eduard Steichen (1879–1973) said about Lippmann's photographs: 'What wonderful things they are, but one must see them thrown on the screen to appreciate them'.¹² To reach their full visual potential and vibrant colours, projection that could provide the best, most powerful lighting was most commonly used.

There is a kind of a paradox here that I would like to emphasise: the thickness and weight of the glass support, and especially the prismatic shape of the Lippmann plates, give these images an object-like quality. But their materiality, even their physicality as objects, seems to disappear because of the way in which the recorded image is made visible by projection.

In fact, these colour photographs exist as images through the effect of the projector's electrical light beam working in parallel with the darkening of the projection room itself. This effectively makes them immaterial and gives them a duration that depends on their illumination and their appearance on the screen that intercepts them. It is a major difference when compared to photographs on paper. Above all, projection implies a collective experience. It transforms each photograph into a spectacular image. The projector converts the small size of the photographs—6 x 9 cm (Lippmann) or 9 x 12 cm (Autochrome)—into the format of a framed painting. The colour

12 'An Interview with Mr. Edouard [sic] J. Steichen', *Photography*, 16 July (1907), 45–47 (p. 45).

photographs appear as luminous paintings, encouraging comparisons with the iconography of pictorial genres like still life, landscapes and portraits.

Indeed, it should be noted that the interferential photographs made by Gabriel Lippmann and his wife¹³ were described as ‘watercolours with a power of colour, a richness of tone that the painter’s palette could never achieve’.¹⁴ In 1905, even members of the Paris Académie des sciences reiterated the analogy: ‘The fidelity of the reproduction is admirable, and the finesse and accuracy of the tones make M. Lippmann’s photographs comparable, from an artistic point of view, to the paintings of the masters’¹⁵ (see Figure 3.1).



Fig. 3.1. Gabriel and/or Laurence Lippmann, *Bouquet de roses*, 1892–1910, Collection Photo Elysée, Lausanne, ref no. 9919.

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- 13 Cf. Nathalie Boulouch, ‘Gabriel Lippmann et la photographie des couleurs: au prisme de l’actualité de la recherche’, *Rundbrief Fotografie*, 2 (2023), 8–21.
 - 14 Henri Fournier, ‘La photographie des couleurs. Expériences de MM. A. et L. Lumière, d’après la méthode Lippmann’, *Bulletin du Photo-Club de Paris* (1893), 169–73 (p. 169).
 - 15 Letter from E. Bouty and H. Pellat (proposal for the Nobel Prize in Physics).

In 1908, Steichen, recalling his visit to Lippmann's laboratory a few years earlier, described the interferential process as 'undeniably real color photography, for the question of actual coloring matter does not in any form enter into the making of the image, and we have a plate which is actually colorless and resembling an ordinary plate. Yet when seen at a certain angle by reflected light, a beautiful, iridescent image becomes apparent, which when shown by reflection in a projecting lantern, has all the startling realism that the image in a mirror conveys'.¹⁶ Remembering the portrait of a young girl made by Louis Lumière, he argued that 'one would have to go to a good Renoir to find its equal in color luminosity'.¹⁷

From 1907, the Autochrome took the comparison with painting even further. While Impressionism was beginning to be looked at historically and retrospectively in various publications¹⁸ and exhibitions, the practice of colour photography suddenly led to a surprising observation: 'the autochrome plate sees in the same way as the precursory eye of our valiant Impressionists at the end of the last century'.¹⁹ The French autochromist Antonin Personnaz (1854–1936)—a friend of a number of Impressionists and collector of their paintings—went even further: 'what the artist's brush does, the autochrome plate does automatically'²⁰ (see Figure 3.2).

The visual comparison between a magnified Autochrome on screen and a Pointillist painting was formally very striking. The network of dyed grains of starch could be visually related to the surface of the paintings made up of touches of pure colour. The new colour process appeared 'technically pointillist, but expressing colour not by opaque reflection but by transparent illumination'.²¹

16 Eduard Steichen, 'Color Photography', *Camera Work*, 22 (1908), 13–24 (p. 14).

17 *Ibid.*

18 Camille Mauclair, *L'impressionisme, son histoire, son esthétique, ses maîtres* (Paris: Librairie de l'art ancien et moderne, 1904); Robert de la Sizeranne, 'Le bilan de l'impressionnisme', in *Questions esthétiques contemporaines* (Paris: Hachette, 1904), pp. 51–103; Théodore Duret, *Histoire des peintres impressionnistes* (Paris: H. Floury, 1906) [expanded reprint of the 1878 brochure].

19 Antonin Personnaz, 'À propos des autochromes. La valeur esthétique de ce procédé', *Bulletin de la Société française de photographie*, 8 (1909), 153–63 (p. 157).

20 Antonin Personnaz, 'À propos of autochromes', *British Journal of Photography*, colour suppl., 3 (September 1909), 68.

21 Anne Hammond, 'Impressionist Theory and the Autochrome', *History of Photography*, 2 (1991), 96–100 (p. 97).



Fig. 3.2. Antonin Personnaz, *Armand Guillaumin peignant 'Baigneurs à Crozant'*, circa July 1907, Société française de photographie, Paris.

The Lumière plate suddenly seemed to embody the process dreamt up by Paul Signac in 1899: 'The time will come when we will find ways either to make better use of the colours currently available to the painter, or to use more beautiful materials or new processes such as, for example, the direct fixation of light rays on sensitised surfaces'.²²

Steichen and Étienne Wallon (1855–1924), a member of the Société française de photographie, were among the first photographers to make the comparison: 'The advantages of purely optical synthesis are well known by painters, and sought after by many of them. If the way in which the tachists' and Pointillists' work is still strongly criticised, it is because the dots they juxtapose are not small enough for our eye to discern them, and for the fusion to be complete at the distance we are from the painting. The autochrome plate does not suffer the same difficulty. It has all the qualities of Pointillism without having its defects,' Wallon declared in 1908.²³

22 Paul Signac, *D'Eugène Delacroix au néo-impressionnisme*, ed. by Françoise Cachin (Paris: Hermann, 1964) [1st edn 1899], p. 137.

23 Etienne Wallon, 'Autochromie et trichromie', *Bulletin de la Société française de photographie*, 19 (1908), 381–402 (pp. 391–92).

Artistic Issues

Starting from the iconographic reference to painting, we might argue in favour of a kind of community of vision, which places photographers using Autochrome in the wake of their Impressionist predecessors. This kind of comparison is made even easier by the fact that photographic research was based on the scientific theories of optics and physiology, which also influenced the artistic approaches of the Impressionists and Neo-Impressionists.

Building on Young and Maxwell's theory of vision, the German scientist Hermann von Helmholtz clarified one of the important scientific paradigms in the mid-nineteenth century;²⁴ according to which the mixing of three coloured light beams (red, green and blue) recreates the sensation of white, while the mixing of pigments (red, yellow, blue) results in black. It is interesting to note that von Helmholtz's *Handbook of Physiological Optics*, in its first French edition of 1867,²⁵ was in the Lumières' personal library. As for the choice of three colours (red, green and blue-violet) in the Autochrome, this was based on the principle of additive colour-light mixing. Due to the materiality of the coloured screen of potato starch, a surprising conclusion could be drawn: 'We can compare a camera equipped with an Autochrome plate to the eye as described by Thomas Young; the three kinds of starch grains on the plate correspond exactly to the three series of fibrils in the retina'.²⁶ This connection marked the connection between the trichromatic theory of colour vision and the additive colour photography principle as it had existed since the 1860s. In 1861, James Clerk Maxwell presented a lecture on colour theory using the principle of three-colour analysis and synthesis. He projected three slides made by the photographer Thomas Sutton and exposed them through red, green and blue filters respectively. Each of the three slides was then projected through that same colour of filter again to create the original coloured image of a tartan ribbon on the screen.²⁷

24 Cf. Paul D. Sherman, *Colour Vision in the Nineteenth Century: the Young-Helmholtz-Maxwell Theory* (Bristol: Adam Hilge Ltd., 1981).

25 Hermann von Helmholtz, *Optique physiologique* (Paris: Victor Masson et Fils, 1867).

26 Fréd. D. Maisch, 'La plaque Autochrome dans ses rapports avec la théorie des couleurs de Young-Helmholtz' (translated from *Photo-Era*), *La Photographie*, 2 (1910), 34–37 (p. 35).

27 Sylvie Pénichon, *Twentieth Century Colour Photographs. The Complete Guide to*

This experimental demonstration had not previously been given outside scientific circles, but from 1869 onwards, the idea was then demonstrated in photographic circles by Ducos du Hauron and Cros. It was only in the 1890s that the principle of three-colour projection was popularised by the American Frederic Eugene Ives (1856–1937) and the Frenchman Léon Vidal (1833–1906) through public lectures.²⁸

In his influential *Modern Chromatics with Applications to Art and Industry* (published in 1879 and translated into French in 1881), Ogden Rood brought the concept of ‘colour mixing’ to the attention of the painters like Signac, Seurat and Pissarro. Having established that a colour could be produced when spots of divided colour were mixed by the eye, he highlighted the superior luminosity of optical fusion over mixing pigments on the palette. His description of retinal pictures as ‘mosaics, made up of an infinite number of points of light’²⁹ sounds like an *avant la lettre* description of the Autochrome screen.

This helps to explain why the Autochrome appeared to demonstrate the theories of the Impressionist and Neo-Impressionist painters. After his visit to the Royal Photographic Society’s annual London Salon, the art critic Wynford Dewhurst wrote: ‘Never have Ruskin’s theories been more convincingly put into practice than by Monet’s practice, and never has a pioneer artist’s practice been so triumphantly vindicated and confirmed as by Lumière’s scientific demonstrations in colour photography’.³⁰

By comparing autochromy to painting, photographers were above all serving the cause of their own quest for artistic legitimacy, which was being debated within the Pictorialist movement. The Autochrome medium of transparent glass was not well suited to the Pictorialist aesthetic which was based on artistic control during the printing onto paper. According to the Pictorialist doctrine, colour had to express a subjective perception, a transposed vision of natural colours. The point

Processes, Identification & Preservation, op. cit. pp. 10–11.

28 Nathalie Boulouch, ‘Un problème, deux idées, trois controverses. Brève histoire de la réception de la photographie des couleurs jusqu’à 1907’, *Recueil des travaux de l’Académie des sciences, lettres et arts d’Agen* (2022), 27–34.

29 Ogden N. Rood, *Modern Chromatics with Applications to Art and Industry* (London: C. Kegan Paul & Co., 1879), p. 10.

30 Wynford Dewhurst, ‘What is Impressionism?’, *The Contemporary Review*, March 1911, 294. Quoted by Anne Hammond, ‘Impressionist Theory and the Autochrome’, *History of Photography*, 2 (1991), 96–100 (p. 98).

was not to reproduce hues but to evoke them. Colour did not have to be subsumed into an imitative relationship with the subject: rather, it should be a 'summary' (*résumé*) of a colour sensation. By reproducing natural colour without any guidance or control from the human hand, colour processes reinforced the mimicking of reality from which Pictorialism had freed photography. As the French theorist Frédéric Dillaye pointed out: 'A whole world separates [...] the reproduction of exact colour from the expression of sensed colour'.³¹ From this perspective, early colour photography lacked the interpretative latitude of pigment prints, limited as it was to a small palette with harmonious tones, and the degree of realism brought about by natural colours in no way enhanced artistic value.

This was pointed out by Constant Puyo, one of the famous members of the elite Photo-Club de Paris, who as early as 1898 referred to a projection of Lippmann's photographs: 'The dazzling bouquets that Mr Lippmann projects on the screen have precisely the same effect on me as illuminated fountains or the Loïe Fuller; it is a visual spectacle, a physical caress of the retina, an exquisite sensation, but it is a pure sensation that refuses to develop into a feeling [...] these images are utterly impersonal; they are scientific products and, despite the fact that they are beautiful, they have no soul'.³² In other words, where the seduction of the senses begins, art ends. Puyo rejected *trompe l'œil*, an illusion that he considered no more than an elementary and vulgar sensation. Moreover, whereas the aesthetic relationship to an artwork was individual or shared in a very small group, projection suddenly transformed it into a collective experience akin to a conference or a spectacle that obliterates any artistic consideration. Audiences in photographic circles were already familiar with projection evenings. These were part of the social life of the photographers' associations that had sprung up in Europe and the United States. Projection was thus seen either as an educational tool or as a form of popular entertainment. This confusion was reinforced by the fact that the Lumière brothers had projected some of their interferential photography at the time of the cinematograph's launch in 1895.

31 Frédéric Dillaye, 'L'aquarelle par la gomme à plusieurs couches', *La Revue de photographie* (1905), 202–10 (p. 203).

32 Constant Puyo, 'À propos des envois de Vienne et de Hambourg au Salon de Paris', *Bulletin du Photo-Club de Paris*, 90 (July 1898), 219–27 (p. 224).

It might be possible to conceive of a role for projection in the circulation of images, ideas and models within Pictorialism. But a photograph made visible on a screen thanks to the power of light from a projection lantern could not find its aesthetic place outside the exhibitions in the Beaux-Arts-inspired salons that had already established themselves to disseminate artistic photography. The British Pictorialist photographer George Davison took an enlightened view:

There's a tendency among our most prominent artists to devalue slides as irrelevant to art. [...] There is no reason [...] why the same artistic qualities and feelings cannot be found in both glass and paper prints. The lighting conditions of the image are not the same, it's true, but we don't see the elements that can prevent these productions from being works of art. The real reason for the aversion to projection slides on the part of artists who are only concerned with photography from a pictorial point of view, must be sought in this fact [...] We need to contemplate works of art in daylight and without the aid of cumbersome apparatus. This is the real reason why glass prints cannot replace paper prints.³³

Although widely acclaimed, the Autochrome provoked an identical debate about its artistic merit that focused first on the problem of colours and their realism, linked to the automation of the process, and second on the way it was disseminated. The luminous vibrancy peculiar to the Autochrome was one of its essential artistic qualities. This effect was the result of the granular structure of the three-coloured screen and the way it was mixed with the additive method, as well as the glass support. The qualities of the Autochrome were vastly enhanced when viewed through transmitted light. For this reason, Personnaz insisted that projection was the most suitable means for bringing out the shimmering effect of light and sense of atmospheric depth in his photographic series,³⁴ which are in many ways reminiscent of Monet's artistic vision when he was painting haystacks or Rouen Cathedral at different times of the day or year.

However, in the context of Pictorialism—where the aesthetic value of the print was validated by its exhibition or its publication in a photographic journal—how could a photograph which made its final

33 George Davison, 'À l'étranger. Angleterre: Diapositives pour projection', *Bulletin du Photo-Club de Paris* (1896), 418.

34 Antonin Personnaz, 'Rapport de la commission chargée de proposer un candidat pour la médaille Peligot de 1907', *Bulletin de la société française de photographie*, 5 (1908), 108–09.

impression on the screen find its place? This was the whole issue for colour in photography. At its heart, the debate opposed different ways of viewing photographs. Eduard Steichen, the famous member of the American Photo-Secession group, who was a regular visitor to Paris at the time and had experimented with Autochrome samples provided by Lumière in June 1907 when the process was first marketed in France, incorporated these questions into his assessment of the process in an article published in French in 1908 in *La Revue de photographie*: 'First of all, it seems certain that any other image intended to be seen by transparency calls for colour. Because no other viewing conditions will give us such a sense of colourful intensity—the superb stained-glass windows of Chartres Cathedral, for example, [...] are proof of this. [...] The photographer triumphs over the painter because light shines through his colours'.³⁵

Autochromists struggled to find a space for artistic recognition. The road to success was rocky. In 1926, the Comte de Dalmas (1862–1930)—an amateur photographer who was a member of various photographic associations, including the Société française de photographie in Paris—observed that the Autochrome plate 'deserves better than the pale secondary role to which it is relegated'.³⁶ According to him, the first cause of the Autochrome's rejection was still 'the presentation of the work, which is only properly done justice by projection'.³⁷ The conclusion was clear: due to its symbiotic link with projection, early colour photography as an 'image of light' would not succeed in establishing itself as an artistic medium in a photographic context, which had already established the value of images on paper. If it was possible, on the one hand, to conceive a role for projection in the circulation of images within Pictorialism,³⁸ it was, on the other hand, more difficult to accept that a photograph finds its visibility and artistic value on a screen with the power of a lantern's light.

35 Eduard J. Steichen, 'Les harmonies de couleurs et la plaque Autochrome', *La Revue de photographie* (1908), 7–13 (pp. 7, 9).

36 Comte de Dalmas, 'Propos sur l'autochromie', *Bulletin de la Société française de photographie*, 4 (1926), 112–13 (p. 112).

37 *Ibid.*, p. 113.

38 Nathalie Boulouch, 'Figurez-vous un écran... La photographie projetée autour de 1900', in ed. by Nathalie Boulouch, Anne Lacoste, Olivier Lugon, Carole Sandrin, *Diapositive. Histoire de la photographie projetée* (Lausanne: Musée de l'Elysée; Editions Noir sur blanc, 2017), pp. 162–75.

If it can be said that colour photography found a way to exist at the turn of the century, its recognition depended on its method of diffusion. The link with projection, which made photographs immaterial images, challenged materiality and certainly contributed to the sidelining of colour photography as an art form and to its partial historiographical erasure.³⁹ At the time, material paper prints were the reference point.

Conclusion

As a conclusion in the form of an epilogue, I would like to mention *Les Intermittences du cœur* (2019),⁴⁰ a laboratory performance developed by Baptiste Rabichon (born in 1987) and Fabrice Laroche (born in 1968) as a series of contemporary prints made from projected Autochromes. The starting point of the project was the discovery, in a private collection, of a small set of Autochromes made in Boulogne-Billancourt around 1910–1917 in the gardens of Albert Kahn, the philanthropic banker who initiated the Archives de la planète: a collection of 72,000 Autochromes. The duo of French photographers decided to reproduce these Autochromes by projecting, enlarging and printing them on photographic paper. In the dark, each original Autochrome was placed in a wall-mounted enlarger and projected onto very large-format photographic paper to match its dimensions. After a ten-minute adaptation period in the dark, the photographers moved the paper to record the luminous colour image. The exposure time was approximately fifteen minutes.

Through this process, a shift takes place. A different image is revealed. The modern print reverses the characteristics of the old image: the slide takes on the unnatural role of a negative to produce a new image. Transparency becomes opacity, the small format (9 x 12 cm) becomes monumental (130 x 245 cm) and the materiality of the granular potato starch substrate—which is invisible to the naked eye—asserts itself. Looking at the monumental print, a tension is created through approach and retreat: sometimes the viewer's gaze is lost in the expanse of the silver surface, while sometimes it focuses on the details. The eye picks out sharp or blurred areas, depending on how close the

39 Cf. Nathalie Boulouch, *Le ciel est bleu. Une histoire de la photographie couleur* (Paris: Textuel, 2011).

40 <https://galeriebinome.com/les-intermittences-du-coeur/>.

projected image is to the paper, suggesting a strong link with Monet's paintings representing his garden at Giverny. By bringing out the grains of the Autochrome, the images recall the historical comparison to Impressionist painting. In the age of digital photography where images are fluid and dissociated from material support, this work by Rabichon and Laroche highlights that colour, in its materiality, matters.

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PART II

4. Whitewashing the Wards? Colour, Health, and Victorian Hospital Interiors

Kay Simpson

Hospitals have always been colourful, but they have not always been seen as such. It is known that twentieth-century debates over the design of healthcare spaces schematically counterposed the all-white hospital as an icon of achromatic hygienic efficiency with bright and cheerful colours as a humanising alternative.¹ However, it has not been widely noted that this opposition goes back to the Victorian transformation of hospitals between 1860 and 1914, when they underwent sweeping reform and expansion—and not just to accommodate antiseptic, then aseptic surgery and more complex laboratory technology.² As hospitals began to welcome more of the population, types of institution proliferated to serve middle-class clients as well, with the experience of a private

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- 1 R.F. Wilson, 'The Use of Colour in Hospitals', *Journal of the Royal Sanitary Institute*, 70.4 (July 1950), 317–22; Nuffield Trust and University of Bristol Trust, *Studies in the Functions and Design of Hospitals* (Oxford: Oxford University Press, 1955); D.W.A. McCreadie, 'A Hospital Colour Scheme', *British Medical Journal*, 1.5293 (16 July 1962), 1687–89; N. Camgöz, Hillary Dalke, Paul J. Littlefair and David J. Loe, *Lighting and Colour for Hospital Design: A Report on an NHS Estates Funded Research Project* (Norwich: TSO, 2004); Victoria Bates, 'Cold White of Day: White, Colour, and Materiality in the Twentieth-Century British Hospital', *Twentieth Century British History*, 34.1 (March 2023), 1–37.
 - 2 Keir Waddington, *Charity and the London Hospitals 1850–1898* (London: Royal Historical Society, 2015); Guenter B. Risse, *Mending Bodies, Saving Souls: A History of Hospitals* (Oxford: Oxford University Press, 1999); John V. Pickstone, *Medicine and Industrial Society: A History of Hospital Development in Manchester and its Region, 1752–1946* (Manchester: Manchester University Press, 1985); Brian Abel-Smith, *The Hospitals 1800–1948* (Cambridge, MA: Harvard University Press, 1964).

hospital room in a converted Kensington townhouse a world away from the packed wards of a county workhouse infirmary.³ Far more than historians have appreciated, this diversification in practices of design and care went hand in hand with debate over colour: the whitewashed walls that had become standard by midcentury were challenged by variegated colour schemes modelled on domestic interiors.⁴ Focusing on the use of colour in hospital interiors brings critical insights for historians of medicine and the interdisciplinary field of material colour studies.⁵ It foregrounds fresh aspects of the affective, sensory and material histories of illness within histories of hospital care. At the same time, it reveals how interventions in hospital spaces informed the social function of colour in a culture that mixed health, sight and moral rectitude.⁶

Historians have begun to explore twentieth-century hospital colour, pushing back against such simple narratives as white versus colour by demonstrating the layered moral, social and institutional considerations that went into colour practices.⁷ However, little attention has been paid to the nineteenth-century precedents. This risks not only miscasting motley Victorian hospitals as uniformly monochromatic, but also

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- 3 Annmarie Adams, *Medicine by Design: The Architect and the Modern Hospital* (Minneapolis: University of Minnesota Press, 2008); *English Hospitals 1660–1948: A Survey of Their Architecture and Design*, ed. by Harriet Richardson (Swindon: Royal Commission on the Historical Monuments of England, 1998); Jeremy Taylor, *Hospital and Asylum Architecture in England: Building for Health Care* (London: Mansell Publishing, 1991).
 - 4 An exception is Jeanne Kisacky who addresses changes in Victorian ward colour, briefly, in her *Rise of the Modern Hospital: An Architectural History of Health and Healing, 1870–1940* (Pittsburgh, PA: University of Pittsburgh Press, 2017), pp. 56–57, 275–77.
 - 5 I am indebted to research presented at the 2023 ‘Colour Matters’ conference, and the network of historians foregrounding industrial transformations in the perception and production of colour: Charlotte Ribeyrol, ‘Reading the Colours of Victorian Interiors: The Poetic Home Revisited’, *Cahiers Victorians et Édouardiens*, 97 (Printemps 2023); Kirsty Sinclair Dootson, *The Rainbow’s Gravity: Colour, Materiality and British Modernity* (New Haven: Yale University Press, 2023); Nicholas Gaskill, *Chromographia: American Literature and the Modernization of Color* (Minneapolis: University of Minnesota Press, 2018). Special thanks to Phillipa McDonnell at the University of Lincoln for generously sharing her work and insights as an architectural researcher on the material culture of Victorian paint.
 - 6 Jordanna Bailkin, ‘Color Problems: Work, Pathology, and Perception in Modern Britain’, *International Labour and Working-Class History*, 68 (2005), 93–111. Chris Otter, *The Victorian Eye: A Political History of Light and Vision in Britain, 1800–1910* (Chicago: University of Chicago Press, 2008).
 - 7 Central here is Bates, ‘Cold White of Day’.

misrepresenting debates over colour, the institutionalisation of illness and the built environment as products of uniquely twentieth-century concerns. This chapter sketches a history of Victorian hospital colour as ancestral to twentieth-century conversations on subjects such as hygienic whiteness and the humanisation of institutional spaces via colour variation, while demonstrating the different registers of these issues in light of distinctively Victorian considerations of class, gender and illness.

The history of Victorian hospital interiors has to be recovered in fragments. Wall colours are fleeting; they have been stripped, painted over, knocked down and worn away. With a few remarkable exceptions, the evidence is textual and highly limited at that. There was no standard practice of recording interior decoration in annual reports beyond vague budgetary figures; mention of specific colours or decorative decisions is exceptional; coloured drawings and artworks are limited. Before the widespread use of colour photography, chromatic descriptions must be pieced together from sparse references in local newspapers and specialist periodicals, receipts and public health inspection records, literary commentaries and once-private journals. In 1890 a *Handbook of Public Health*, intended to offer official guidance to newly-appointed local health authorities, advised only that the walls of hospital wards be 'toned in some cheerful tint'.⁸

Trying to map the descriptive language of colour also leads to telling contradictions. Writing in her monumental *Notes on Hospitals* that the 'gloom of the dark ward is irremediable', Florence Nightingale positioned bright, bare white walls as part of the vanguard of progressive, hygienic hospital design.⁹ Less than two decades later, London-based physician Julius Lawrence-Hamilton, in a bid for more vibrant decorative schemes, derided the sea of 'dull' and 'dreary whitewash' that suffused the wards in 'gloom'.¹⁰

8 Sir John Skelton, *The Handbook of Public Health* (Edinburgh: William Blackwood and Sons, 1890), p. 129.

9 Florence Nightingale, *Notes on Hospitals*, 3rd edn (London: Longman, Green, Longman, Roberts and Green, 1863), p. 19. The line was present in Nightingale's 1858 lectures to the National Association for the Promotion of Social Science that formed the basis for *Notes*.

10 Julius Lawrence-Hamilton, 'Hospital Wall Ornamentation', *The Furniture Gazette* (27 January 1877), 51. The publicity and background surrounding Lawrence-Hamilton's appeal is discussed further in Susan Barclay, 'When It's Not the Main Game: Art in

For this reason, while taking a broadly chronological approach, I resist any easy periodisation. I demonstrate rather how different groups of actors developed contrasting views of hospital colour during a period of enormous industrial and institutional change. Two central arcs emerge from this—the ubiquity and subsequent criticism of white walls as a hygienic standard from around 1850, and the increasing diversification of hospital interior colour as the century wore on.

White Walls and Bad Air

Whitewashing—coating walls with powdered and diluted lime or chalk, often in several layers—went back hundreds of years. Through the seventeenth and eighteenth centuries, whitewash was famously used by Protestant iconoclasts to de-Catholicise the polychromatic interiors of churches with blank, cleansed luminosity. This religious, purifying dimension of whitewashing dovetailed with its longstanding use as a health measure for public buildings and homes, especially during times of plague.¹¹ Historians have speculated that the aesthetic and material qualities of whitewash conferred hygienic status. It eradicated blemishes, while the corrosive, caustic lime literally ate away at the surfaces it touched.¹² The name belied variability in hue subject to the refinement of the raw materials—calcium hydroxide or calcium carbonate—and the locales from which these were sourced. Whitewash thus often took on various yellow or grey tints. Material histories of hospital whiteness, furthermore, tell us that whiteness enshrined cleanliness only insofar as it was rigorously maintained. The re-whitewashing of walls was often an annual or semi-annual ritual.¹³

During the 1830s and 1840s, sanitary reform put its weight behind whitewashing.¹⁴ A first wave of reformers—professionally diverse but largely drawn from the ranks of the educated middle class—emphasised the need to develop new measures for the centralised

Hospitals' (unpublished doctoral thesis, University of Western Sydney, 2015), pp. 83–89.

11 Victoria George, *Whitewash and the New Aesthetic of the Protestant Reformation* (London: Pindar Press, 2013).

12 *Ibid.*, p. 67.

13 Bates, 'Cold White of Day'.

14 Risse, *Mending Bodies, Saving Souls*, p. 366.

control of public health. Against a backdrop of rapid urban industrial growth and cholera outbreaks, doctors and the new medical officers of health increasingly linked whitewash as a sanitary intervention with theories of disease as caused by miasmata, airborne emanations rising from decomposing filth.¹⁵

Whiteness and whitewashing were thus further enshrined as mass health interventions against pathologies of darkness and dirt, epitomised in the urban slum as a chief target of reform initiatives. In 1839 the physician James Stark, who would become one of Scotland's first public health statisticians, presented a widely circulated paper to the Royal Society. In it, he proposed that darker colours absorbed more odours, as well as heat, based on a series of experiments he had conducted with skeins of coloured wool.¹⁶ Referring to the recent epidemic of cholera, he concluded that 'it is to white-washing that I should attribute much of the good effects [...] [along with] personal cleanliness, and free ventilation [...] for destroying or diminishing the effects of supposed pestilential or hurtful effluvia'.¹⁷

In hospitals, whitewashing had been practised long before 1850. The philanthropist and social reformer John Howard, in a survey of London's hospitals published posthumously in 1791, criticised the prevalence of 'dirty' walls that 'wanted whitewashing'.¹⁸ For most of their history, hospitals were primarily charitable institutions directed toward managing large populations of the sick poor. In many cases, whitewashing or plastering was preferred as an economic and hygienic measure, with many civic and charitable committees employing it across prisons, factories and workhouses. The latter example epitomised the decorum of the whitewash, where the severe, moralised frugality of blank walls underlined the status of these spaces as the last refuge of the

15 Christopher Hamlin and Sally Sheard, 'Revolutions in public health: 1848, and 1998?', *British Medical Journal*, 317.7158 (August 1998), 587–91. David Barnes, *The Great Stink of Paris and the Nineteenth-Century Struggle Against Filth and Germs* (Baltimore, MD: Johns Hopkins University Press, 2006), especially chapter 2. The Poor Law Commission's 1839 report placed new emphasis on improving the nation's sanitary conditions based on miasmatic theories of disease.

16 James Stark, 'On the influence of Colour on Heat and Odours', *Philosophical Transactions of the Royal Society of London*, 123 (December 1833), 285–312.

17 *Ibid.*, p. 310.

18 John Howard, *The Works of John Howard, Esq.*, vol. 2, 2nd edn (London: J. Johnson, C. Dilly, and T. Cadell, 1891), p. 126.

truly desperate.¹⁹ Those who could afford it sought treatment at home.

At the same time, the opening of new voluntary hospitals throughout the early nineteenth century often saw charitable foundations buy or rent private domestic buildings. In these cases, the walls of many newly designated 'hospital' spaces might bear the painted or wallpapered remnants of their domestic origins before committees were able to raise funds for new, purpose-built premises.²⁰ These hybrid interiors signalled the lack of a standard or regulated practice of hospital decorating amidst the proliferation of new hospital spaces to serve burgeoning industrial populations.

During the 1850s and 1860s, reformers and public health officials increasingly turned their attention en masse to hospitals as public institutions in need of sweeping design intervention. These concerns over unhygienic hospital design were not wholly new, but they found unprecedented publicity and advocacy as an interdisciplinary cause for reform. The surgeon and obstetrician James Young Simpson would help develop the term 'hospitalism' to deride the sanitary conditions of contemporary hospitals as crowded, poorly ventilated and dirt-infested—terms that sanitarians also used to describe urban slums.²¹ Yet the ideal of the plain white hospital interior found its greatest publicist in Florence Nightingale and her exemplary work at the Scutari Hospital in Turkey during the Crimean War (Figure 4.1). Here, Nightingale promoted her vision of hygienic ward design and sanitary reform. This featured light, non-absorbent walls as part of a totalising scheme encompassing proper drainage, removal of unnecessary furnishings, and wide windows to let in light and fresh air.²²

19 Barclay 'Art in Hospitals', p. 27. This material character and cultural status of the workhouse is explored in Norman Longmate, *The Workhouse: A Social History* (London: Pimlico, 2003), especially pp. 199–200.

20 Christine Stevenson, 'Medicine and Architecture', in *Companion Encyclopaedia of the History of Medicine*, ed. by W.F. Bynum and Roy Porter (Abingdon-on-Thames: Taylor & Francis, 1993), pp. 1495–519 (p. 1500).

21 James Young Simpson, *Anaesthesia, Hospitalism, and Hermaphroditism, and a Proposal to Stamp Our Small-Pox and Other Contagious Diseases*, ed. Sir W.G. Simpson (Edinburgh: Adam and Charles Black, 1871); Michael Worboys, *Spreading Germs: Disease Theories and Medical Practice in Britain, 1865–1900* (Cambridge: Cambridge University Press, 2000), pp. 77–86; Risse, *Mending Bodies*, p. 366.

22 Nightingale, *Notes on Hospitals*, pp. 44–45, 68–69.



Fig. 4.1. Edmund Walker (after William Simpson), *One of the Wards of the Hospital at Scutari*, 1856, coloured lithograph, Wellcome Collection 21465i, London.

Nightingale used whitewash but preferred the similarly toned Parian cement for its lower porosity and greater durability. Cement did not require the same continual upkeep.²³ Moreover, one of the central problems with standard oil paint, according to Nightingale, was that it was 'saturable' and 'dampable'. It met hygienic standards only if frequently reapplied and varnished, and she considered the contemporary range of varnishes unfit for purpose.²⁴ The blankness of the white was preserved by Nightingale's stricture that walls be kept bare, since adornments might trap dust and disease. Her aggressive cleaning regime of carbolic acid also threatened to dissolve or discolour any paper ephemera hung on the walls, as well as erode any tinted varnish.²⁵

Nightingale's rejection of colour in hospital spaces serving the poor

23 Nightingale to Douglas Galton, 24 September 1863, in *Florence Nightingale and Hospital Reform: Collected Works of Florence Nightingale*, vol. 16, ed. by Lynn McDonald (Waterloo, Ontario: Wilfrid Laurier University Press, 2012), p. 423.

24 Nightingale to Harry Verney, 2 January 1861, in *Florence Nightingale and Hospital Reform*, p. 651.

25 Barclay, 'Art in Hospitals', p. 70.

contrasts with her advice in the wildly popular *Notes on Nursing* (1859), which emphasised the ‘effect in sickness of beautiful objects [...] and especially of brilliancy of colour’.²⁶ The volume was aimed at private nurses and other people caring for upper- and middle-class clients in their own homes, sometimes even in a designated ‘sick room’ outfitted for extended periods of convalescence.²⁷ The class dynamics of varied colour and whiteness are clear: the former was a sensitive balm for the recovery of the well-to-do at home; the latter a hygienic necessity for the institutional care of the poor, who were victims of the darkness and degradation of their slum housing.

Following Nightingale, sanitary reformers during the 1860s further elevated stark, white, non-absorbent hospital walls as a moralised component of hygienic hospital design. An 1864 editorial in *The Lancet* praised the new Birkenhead Borough Hospital for its well-ventilated, light wards finished with ‘Parian cement’. It noted that design authorities on the subject—such as Florence Nightingale—consider it necessary ‘to maintain the health and promote the recovery of those within its walls’.²⁸ In the Privy Council’s report on the hospitals of England of the same year, neurologist and physician John Bristowe and surgeon Timothy Holmes similarly advised whitewashing or Parian cement for cleanliness.²⁹

It would be misleading, however, to claim that white walls and whitewashing were uniformly adopted across hospitals in Britain during this time. There was no centralised health infrastructure to enforce such a unilateral measure, and these institutions had vastly different resources and governance arrangements. However, white walls and, critically, the labour involved in maintaining their whiteness—be it reapplications of whitewash or regular cleaning with carbolic acid—became associated with a hygienic ideal that dominated in the 1850s and 1860s. The

26 Nightingale, *Notes on Nursing*, pp. 33–36.

27 For the reception, audience and editions of *Notes on Nursing*, see Victor Skretkowicz’ introduction to *Florence Nightingale’s Notes on nursing; commemorative edition with commentary*, ed. by Victor Skretkowicz (New York: Springer, 2010).

28 ‘Liverpool (From our own correspondent)’, *The Lancet*, 83.2105 (2 January 1864), 24–25 (p. 25).

29 John Syer Bristowe and Timothy Holmes, ‘Report by Dr. John Syer Bristowe and Mr Timothy Holmes on the Hospitals in The United Kingdom’, *Report of the Medical Officer of the Privy Council* 6, Appendix 15 (London: HMSO, 1863), 463–570 (pp. 504–05).

whitening of hospital walls was a purifying act, a moral as well as health intervention against the polluting, darkening effects of industrialisation and urbanisation. Yet, even as the crusade for bare white hospital walls gained momentum during the 1860s, a host of critics emerged with a divergent—though equally moralised—understanding of colour and its relationship to health.

Different Kinds of ‘Gloom’

When *Notes on Hospitals* stated that ‘the gloom of a dark ward is irredeemable’, Nightingale presented pathogenic darkness as needing reform by light, bright white walls.³⁰ Only five years later, the eminent physician and sanitarian reformer Benjamin Ward Richardson took aim at a different kind of gloom in a series of articles on the nation’s hospitals in the *Medical Times & Gazette*. He disparaged the whitewashed walls of the Stafford County Infirmary: ‘to lie for weeks in that gloom would surely of itself be worse than that arising from diseases, under a happier sky’.³¹ He criticised the similarly white-walled interiors of the Royal Berkshire Hospital as ‘cheerless’ and ‘inanimate’.³² In that same year, the Reverend Harry Jones, in his successful 1864 collection of general yet pointed commentaries, took aim at the hospital interior when he wrote: ‘You are overwhelmed with a conspicuousness of cleanliness and ventilation. It must be depressing [...] for the sick to see [...] [H]ospital walls are too white and staring; I should like to see more colour’.³³

Around 1860, the word ‘hospital’ conjured up for much of the public the large, general hospitals prominently visible in the major cities and towns of the country. Richardson and Nightingale were sanitarian figureheads who attached profound importance to the built environment.³⁴ The design of hospital interiors was a pressing concern

30 Nightingale, *Notes on Hospitals*, p. 19.

31 B.W. Richardson ‘The Medical History of England’, *Medical Times and Gazette*, 1 (27 February 1864), 237–40 (p. 238).

32 Royal Berkshire Hospital: B.W. Richardson ‘The Medical History of England’. *Medical Times and Gazette*, 2 (24 December 1864), 683–88 (p. 685).

33 Harry Jones, *Holiday Papers* (London: Robert Hardwicke, 1864), p. 239.

34 Both can be considered within Annmarie Adams’s category of ‘building doctors’ within the sanitation movement who promoted rationalised design as part of medical practice: Annmarie Adams, *Architecture in the Family Way: Doctors, Houses, and Women, 1870–1900* (Montreal: McGill-Queen’s University Press, 2001),

given the massive investment in the construction of new facilities from the 1850s and 1860s and continuing through the rest of the century.³⁵ These institutions, like Richardson's Stafford County Infirmary or Sussex Country Hospital, might house hundreds if not several thousands of patients at a time, and the choice of wall colours was often left to hospital administrators or boards of governors, whose central concern was cost.³⁶

The link between hospital whiteness and economic frugality led many to conflate whiteness with deprivation, especially doctors and nurses, who spent far more time on the wards than did lay administrators. In 1862, the surgeon Charles Hawkins, later head surgeon of the Queen Charlotte Hospital, wrote to the *Lancet* to lament how English hospitals lagged behind their continental counterparts. He particularly implicated the miserliness of hospital administrators in his recommendation for 'spending a little money in ornamentation of the wards [...] to enliven the spirits and hasten the cure of many a patient now doomed to have nothing on which to rest a restless eye than the eternal whiteness of most hospitals'.³⁷

Pressure could also come from new public health oversight bodies, principally local government boards, whose visits were introduced in 1871 as part of welfare efforts instigated by the Reform Act of 1867. An 1871 meeting of the board of guardians for Sheppey Workhouse in Kent noted the advice of a visiting committee that the infirmary 'required colouring and painting'. But one of the board members 'totally objected' to this and, after some discussion, proposed conclusively that the walls be 'lime washed by some inmate at the house'.³⁸

Challenges to the hegemony of bare white walls also came from architects, decorators and the nascent profession of interior designers. The sanitation movement had encompassed architecture and design as components of the new sanitary science.³⁹ This empowered professionals in those fields to claim authority in matters of sanitary

especially chapter 2.

35 Taylor, *Hospital and Asylum Architecture*, p. vii.

36 On the administrative structure of Victorian hospitals, see Waddington, *Charity and the London Hospitals*, pp. 3–5.

37 Charles Hawkins, 'Correspondence. On the Construction of Hospital', *The Lancet*, 80.2027 (5 July 1862), 20–21 (p. 21).

38 'Sheppy Board of Guardians', *Sheerness Guardian and East Kent Advertiser*, 1 July 1871, 5.

39 See Adams, *Medicine by Design*; and Adams, *Architecture in the Family Way*.

design, an expertise made appealing by the rising status of doctors and surgeons. The 1884 International Health Exhibition featured a vast number of speakers, including authorities from architecture, design and commerce. Among these was the unsuitably named architect William White, who had lectured on the 'Hygienic Value of Colour' and against Nightingale's bare white walls as early as 1861. Citing its 'unconscious influences', he stressed the relevance of colour to health:

I have myself heard the aged invalid speak of the great relief afforded by the eye resting even on the flowing pattern of the common wall-paper during recovery [...] [C]olour of some sort is indispensable to the healthy condition of the eye itself [...] and cannot be banished from [man's] presence without rendering him liable to physical deterioration and mental derangement.⁴⁰

White went so far as to accuse Nightingale herself of popularising a 'universal absence of colour', in the whitewashing of hospital spaces where 'the sick and poor [were] condemned to drag out their existence'.⁴¹

The status of hospitals as institutions for the poor had informed the use of whitewash as a mass public health intervention and shaped its critique. An anonymous 1866 pamphlet, its claims circulated in the *Lancet*, described how the 'bare, white-washed wall has a look and tone of desolation'. The author warned that 'we really can never hope that our working classes will master the virtues, if they are not trained to the refinements of civilization'.⁴²

These class dynamics of colour are illustrated in the paternalistic and pedagogical language with which reformers emphasised the importance of colour in institutional spaces for the poor and working classes. Social reformer Octavia Hill developed her approach to aesthetics and moral education in part through friendship with John Ruskin. She set up the Kyrle Society alongside her sister Miranda Hill in 1876, with the goal of 'bringing the refining and cheering influences of natural and

⁴⁰ William White, 'A Plea for Polychromy', *The Building News and Engineering Journal*, 7 (18 January 1861), 50–55. For a version of White's IHE lecture: William White, 'Hygienic Value of Colour in the Dwelling', *The Building News and Engineering Journal*, 47 (1884), 78.

⁴¹ White 'A Plea for Polychromy', p. 51.

⁴² *Overcrowding: The Evil and Its Remedy* (London: Longmans, Green, and Co., 1866) p. 44. The article was quoted in 'Addenbrooke's Hospital, Cambridge', *The Lancet*, 87.2226 (28 April 1866), 464–65.

artistic beauty into the homes and neighbourhoods of the poor'.⁴³ One of the society's chief activities was the charitable decoration of hospital wards—alongside workmen's clubs, schools and churches. Evidencing the value of this work, Hill recounted the transformative, humanising effect of colour as a component of ward decoration that she experienced on a visit to the Hospital for Accidents in Poplar:

Can you carry [the ward patient's] thoughts anywhere away from his own blasted life? [...] Colour is intended to be a perpetual source of delight [...] [T]ill you have lived among the monotonous, dirty tints of the poor districts of London, you will little know what the colours of your curtains, carpets and wall-papers are to you. Paint the walls, lighten them, brighten them, for the love of colour is a human instinct.⁴⁴

This beautification of hospital spaces was soon imitated and taken up as a cause by women involved in aspects of philanthropic hospital administration. One of the few avenues of their acceptable participation was the provision of ward comforts within the practices of feminine middle-class domesticity.⁴⁵ Indeed, while male hospital administrative committees arranged the painting and permanent fixtures of wards, nursing teams often oversaw the more transient aspects of chromatic ward decoration—rugs, flowers or pictures. This was most spectacularly demonstrated in the annual tradition of the Christmas decoration of hospital wards by their nursing teams. During the 1860s and 1870s, it became more customary for local papers and medical journals to celebrate the spectacular transformation of wards under the supervision of ward nurses. An 1877 general newspaper report on Bristol General Hospital described the wards as 'so gay' in swathes of evergreen, brightly coloured papers and artificial flowers, that a visitor 'could have hardly realised that it was a hospital'.⁴⁶

43 'The Kyrle Society,' *The Academy* (2 March 1878), 197. On the understudied history of the Kyrle Society, see Robert Whelan, "'The Poor, as Well as the Rich, Need Something More than Meat and Drink': The Vision and Work of the Kyrle Society", in Octavia Hill, *Social Activism and the Remaking of British Society*, ed. by Elizabeth Baigent and Ben Cowell (London: University of London Press, 2016), pp. 91–118.

44 Octavia Hill, *Colour, Space, and Music for the People* (London: Kegan, Paul & Co., 1883), pp. 2–4.

45 Arlene Young "'Entirely a woman's question"? Class, Gender and the Victorian Nurse', *Journal of Victorian Culture*, 13.1 (2008), 18–41.

46 'Christmas at the General Hospital', *Western Daily Press*, 26 December 1877, 3.

The opposing 'glooms' of Nightingale and Richardson—gloom as darkness and disease versus gloom as psychological privation—both applied to hospitals serving 'deprived' working-class populations. Deprivation was chromatic as well as sanitary for those accustomed, in Octavia Hill's words, to the 'monotonous, dirty tints' of working-class housing. Here, whiteness denoted absence—of disease and of wealth. From the 1870s onwards, however, new middle-class demographics began to seek treatment in newly opened hospitals, many of which bore little or no resemblance to those of even twenty years prior.

The Home Hospital: Convalescence and 'Cheerful' Colour

In 1880, the financier and philanthropist reformer Henry Burdett debuted a new hospital in London's fashionable Fitzrovia district. Essentially a converted townhouse, the building could not have been less like the vast county hospitals with their hundreds of beds and barren walls. With an initial capacity of only sixteen beds, the majority of the rooms were private, and lavishly decorated with polished oak furniture, red Persian rugs and William Morris-esque wallpaper in soft shades of blue and green.⁴⁷ The hospital was part of Burdett's involvement in the aptly named 'Home Hospital' scheme to construct and improve the condition of hospitals for working- and lower-middle-class patients who were seeking institutional medical care in greater numbers than ever before—and who could afford to pay.⁴⁸

The rise of fee-paying hospitals in the 1870s and 80s reflected larger shifts in medicine as institutional spaces of healing underwent remarkable change. The advance of antiseptic and aseptic surgery, more complex technology and an improved image meant that a broader spectrum of the public sought medical care in a hospital rather than at home.⁴⁹ Some general hospitals introduced smaller, private rooms or a separate ward for fee-paying patients, often with an emphasis on superior

47 'The Home Hospitals Association', *Daily News*, 29 June 1880, 3. Description of wallpaper: 'The First Home Hospital', *Derry Journal*, 14 July 1880, 8.

48 'Home Hospitals', *British Medical Journal*, 1.853 (5 May 1877), 557. Waddington, *Charity*, pp. 43–44, 90–92.

49 Abel-Smith, *The Hospitals*, pp. 150–51, 188–89; Waddington, *Charity*, pp. 4–5.

comfort.⁵⁰ An 1872 account of the voluntary London Fever Hospital in the *Medical Times and Gazette* described its eight private rooms—replete with ‘pleasant, light colour’—as mimicking ‘the sickrooms of the better class’.⁵¹ By 1883, the general wards of the very same Fever Hospital had undergone a redesign, the results of which are preserved in a rare series of 1891 watercolours by a ward nurse, showing green walls with russet dado, floral arrangements and wooden folding screens (Figure 4.2).⁵²



Fig. 4.2. Nurse Flower, ‘The London Fever Hospital, Liverpool Road, Islington: a screened-off bed in a ward’, 1891, watercolour, Wellcome Collection 38507i, London.

The material impenetrability of whitewash and Parian cement was being further undermined by innovations in ‘hygienic’ wall materials introduced onto the market during the 1870s and 1880s. These included more durable varnishes, washable paints that were lead- and arsenic-free, and the rising vogue for glazed bricks and tiles that were easily washed and long-lasting.⁵³

50 Waddington, *Charity*, pp. 91–95.

51 ‘Private Wards at the London Fever Hospital’, *Medical Times and Gazette*, 1 (6 January 1872), 10–11 (p. 10).

52 Franz Oppert, *Hospitals, Infirmarys, and Dispensaries: Their Construction, Interior Arrangement, and Management*, 2nd edn (London: Churchill, 1883), pp. 160–61.

53 The literature of the 1884 International Health Exhibition in South Kensington,

In poorly-funded county hospitals or workhouse infirmaries, where resources were stretched and patients among the very poorest, most management boards and guardians continued to overlook decorative considerations. In an 1894 investigation of workhouse conditions, the *British Medical Journal* criticised the whitewashed walls of the Truro Workhouse Infirmary; white was ‘wearing to the sick’ and the walls should be ‘cemented and washed in two shades of some pretty colour’.⁵⁴

Women—as nurses and as members of charitable societies—were already positioned as sensitive observers and arbiters of hospital interior colour. Through the 1870s and 1880s these roles were increasingly professionalised and institutionalised. Interior designer Agnes Garrett’s much-praised blue and yellow colour scheme for the New Hospital for Women in 1893 reflects both developments. The *Illustrated London News* noted ‘the pervading presence of the womanly element’, which ‘manifest[ed] itself [...] above all, in sympathetic recognition of the mental as well as bodily needs of the patients’.⁵⁵ Other newspaper commentators praised the bold colour scheme of peacock-blue-tiles and yellow paint, noting the ‘unexpected welcome’ given to ‘the poor patient from the dreary grey back street’.⁵⁶

This contrast between the dreary, urbanised exterior and the restorative, feminised colour of the interior mirrored a contemporary discourse of convalescent health that framed interior colour as a component of a wider, therapeutic environment. Convalescence itself was understood as a vulnerable period between illness and health. Here the sufferer no longer required acute medical intervention but did need time to recover. This recovery window involved established practices of lifestyle management that intertwined physical and moral care.⁵⁷ While many who could afford it convalesced at home in designated sick rooms

London includes some of the earliest advertising of paints and wallpapers as ‘non-toxic’ and ‘sanitary’—meaning free from arsenic or lead—including Jeffrey & Co.’s range of ‘patent hygienic wallpapers’ and the United Asbestos Company’s Fireproof ‘non-poisonous’ paint.

54 ‘Truro Workhouse Infirmary’, *British Medical Journal* (29 September 1894), 710.

55 A.C.S., ‘The New Hospital for Women’, *Illustrated London News*, 10 September 1892, 342.

56 *Ibid.*; comment on colour scheme: ‘New Hospital for Women’, *The Queen*, 9 June 1894, 950.

57 Hosanna Krienke, *Convalescence in the Nineteenth-Century Novel* (Cambridge: Cambridge University Press, 2021), pp. 2–4.

or with private nursing teams, the late nineteenth century increasingly saw the institutionalisation of convalescence in special homes.⁵⁸

Convalescent homes were another component of the increasingly broad range of late nineteenth-century healing institutions. They were most frequently located outside city centres, a decision reflecting concerns over the pathologies of modern industrial life—the city as incubator of dirt, disease and nervous breakdowns—which had a distinctly chromatic dimension. An 1888 article in the *Lancet* opened with the rising interest in the ‘remedial value of colour’ within an urban environment where ‘fog is prevalent’, as are the ‘depressing influences of darkness and gloom’.⁵⁹

Praising the Southport Convalescent Home, established in 1876, the *Manchester Courier* asserted that ‘cheerful surroundings’ were ‘of the first importance to the well-being of a convalescent just recovering from a long illness’. With a ‘bright and cheerful’ interior, including a ‘Minton-tiled floor, painted and varnished walls of yellow, with a handsome dark dado’, the home did not have ‘the word hospital branded upon it’, but ‘looks like the private residence of a family well-to do’.⁶⁰ Many medical professionals and philanthropic reformers considered convalescent recuperation as an impressionable period for the re-moulding of identity and behaviour. Middle-class domesticity could therefore model refinement and liberal self-discipline.⁶¹

The model of the convalescent home was increasingly reflected back into the design of urban hospitals, at least in special wards. One of the most ambitious projects of the Kyrle Society, a redesign of the Women’s Convalescent Ward at Westminster Hospital, featured walls of a ‘pale green’ with elaborate friezes of fruit and foliage based on the designs of William Morris, himself a member of the society.⁶² These tertiary ‘art shades’ in vogue in late Victorian hospitals—shades with organic names such as sage and olive green, citrine and ochre yellow, peacock

58 Eli Osterweil Anders, ‘“So Delightful a Temporary Home”: The Material Culture of Domesticity in Late Nineteenth-Century English Convalescent Institutions’, *Journal of the History of Medicine and Allied Sciences*, 76.3 (2021), pp. 265–66.

59 ‘The Medicinal Value of Colour’, *The Lancet*, 132.3407 (1888), 1195.

60 ‘A Convalescent Home’, *Manchester Courier*, 2 February 1880, 3.

61 Anders, ‘Material Culture of Domesticity’. On the larger nineteenth-century discourse of ‘cheerfulness’ and industrial capitalism, see Timothy Hampton, *Cheerfulness: A Literary and Cultural History* (New York: Zone, 2022).

62 ‘The Kyrle Society’, *The Magazine of Art*, January 1880, 210–12 (p. 211).

blue and salmon pink—brought a pastoral colour language into city spaces. The writer Jane Ellen Panton was one of a number of pioneering women who, like Garrett, carved out a space for themselves in the public eye as authorities on interior decoration and aesthetics. Writing in an 1888 guidebook on interior design, she emphasised the power of the domesticated (and feminised) decorative environment to facilitate convalescence:

I point to the hospital wards, transformed from bare whitewashed prisons into artistic, charming, home-like rooms, and I should like to have the statistics given me [...] being perfectly certain that there would be more and quicker recoveries.⁶³

Medical reformers and hospital philanthropists alike viewed colour as a means to redefine the stark, 'prison-like' character of the hospital—a fairly accurate characterisation of midcentury workhouse infirmaries—that had previously been defined by whiteness. This development was tied to the widening institutionalisation of illness, from the growing middle-class demographics of hospital patients to expanded typologies of hospital spaces. Here the affective, 'cheerful' capacities of variegated wall colour, available in a growing range of non-porous and durable products, offered a remedial alternative to what was increasingly perceived as the utility-driven, mass aesthetic of whiteness as a public health intervention for large working-class populations. This link between decorative colour and convalescence was deeply spatial—the difference between the hospital as 'prison' versus recuperative escape. We see this, for example, in the vogue for olive and sage green in 1880s and 1890s homes—colours that decorators described as 'restful' to the eyes and restorative to the soul, a verdant repose that mirrored geographies of convalescence. These tints promised a retreat into nature without leaving hospitals or home, a restorative antidote for the maladies of modern urban life.⁶⁴

63 Jane Ellen Panton, *From Kitchen to Garret: Hints for Young Householders* (London: Ward & Downley, 1888), p. 7.

64 The popularity of (and backlash against) green is discussed in Charlotte Ribeyrol, 'Reading the Colours of Victorian Interiors', par. 14; 24–25. On the poetics of Victorian synthetic colour as a surrogate for 'natural' experience, see Esther Leslie, *Synthetic Worlds* (London: Reaktion, 2005).

Conclusion

In twentieth-century histories of hospital design, the colours of the Victorian past were often tinted to suit the political needs of the present. A 1962 article in the *British Medical Journal* argued that hospital administrators should embrace more variegated colour schemes in order to make hospitals more 'bright and cheerful', humanised spaces. The author portrayed this as a radical departure from bleak Victorian monochrome and bleached modernist machines for living, claiming that 'before 1918', hospital colour schemes were limited only to 'whitewashed walls above dado and dark brown below'.⁶⁵ At the other end of the spectrum, during the 1980s Florence Nightingale was revived as a figurehead of the arts and health movement, and her 1864 line about the health effects of beauty and 'brilliancy of colour' became something of a manifesto for hospital design reform.⁶⁶ This was despite the fact that, as this chapter has argued, her comments on colour were much less influential than her overwhelming advocacy for spotless, white walls as the future of progressive hospital design.⁶⁷ Reconstructing even a fragmentary history of Victorian hospital colour in its own time allows us to recover its legacy beyond such (mis)uses in twentieth-century debates. In doing so, we find that thinking about illness, design and the modern hospital was grounded in deeply moralised approaches to hygiene, affective perception, social identity and, of course, colour.

By positioning the transformation of hospital interiors within histories of Victorian colour, we can see how colour meanings and language were shaped by experiences of illness and, reciprocally, how experiencing colour informed concepts of health. Critics of the whitewashed hospital show how whiteness could be constructed as 'colourless' through a pathological language of nervous health. Here whiteness was constructed

65 McCreadie, 'A Hospital Colour Scheme', p. 1687.

66 Nightingale, *Notes on Nursing*, p. 33. For example, Nightingale is quoted as a reference in support of introducing more colour into hospital wards in a 1993 initiative at St. Charles Hospital in London: Jeremy Hugh Baron, Megan Hadden, and Midge Palley. *St. Charles Hospital: Works of Art* (London: The Hospital, 1993); also in 1992 to support nurses' decorating initiatives: K. Kerfoot and T. Neumann, 'Creating a Healing Environment: The Nurse Manager's Challenge', *Nursing Economics*, 10.6 (1992), 423–25.

67 The misleading legacy of Nightingale in the British arts and health movement is discussed in Barclay, 'Art in Hospitals', pp. 67–74.

as the 'absence' of chromatic stimulation, leading to monotony, fatigue and delayed recovery. These debates over colour versus whitewash in the hospital interior helped to generate period understandings of 'healthy' colour that straddled material, nervous and psychological definitions. We might begin to consider how designers, manufacturers or social reformers drew upon these understandings of healthy colour to craft and market therapeutic environments beyond the hospital.

Victorian colour poetics is frequently identified as a surrogate for something absent—the pre-Raphaelites' bright colours and a moral medievalism, the Aesthetes' 'blue china mania' and Orientalism.⁶⁸ Of course, the substance of colour was transformed as synthetic colours gradually eclipsed their 'natural' counterparts. Commentators often drew attention to the colour of hospital walls during this time, be it shades of whitewash or variegated tints, in order to evoke a vision of what the institutional hospital could be—and by implication to counter anxieties about what it was not. Whitewash implied an absence of darkness, of dirt, and of disease against fears of endemic 'hospitalism'. Variegated colour schemes evoked the welcoming domesticity of the home, with colours named for the organic shades of a restorative nature that contrasted with increasingly urbanised settings.

Women were positioned as ideal subjects and arbiters of interior colour, leading them to take on multifaceted roles in the design of medical spaces. We can see how this changed over the period, from the labour of ward nurses to social and sanitary reformers like Nightingale or Octavia Hill and the emergent professional identity of interior designers and decorators.

These chromatic histories document disquiet about hospitals as institutions as they underwent a period of unprecedented expansion and transformation. Unsurprisingly, these fears were often rooted in class concerns: sanitary reformers used the need to contain illness among the pathologised urban working classes to position white walls as the hygienic standard at midcentury. This association of white hospital walls with privation and economy led reformers like Henry Burdett to reframe hospitals, especially those with a new profit incentive, as acceptable to the middle classes. This was done chromatically through

68 *The Colours of the Past in Victorian England*, ed. by Charlotte Riberyol (Oxford: Peter Lang, 2016), p. 6.

an emphasis on domesticated colour—tints with art colour names like ‘peacock blue’ or ‘sage green’—that would not have seemed out of place in the latest home decoration supplements.

Hospital colour was bound up with wider assumptions and anxieties about the increased institutionalisation of illness, the social hierarchies of patient sensitivity and affectivity, and hygiene as a concept caught between materiality and mentality—the experience of walls as a surface for contamination and a conduit of emotions. By recovering the colours of Victorian hospitals, we might begin to rescue from crude whitewashing a richer picture of the profound linkages between colour, health and the built environment.

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5. From Hysteria to Healing: Félix Vallotton's *Bon Marché* and the Ambiguous Nature of Colour in *Fin-de-Siècle* Culture¹

Alessandra Ronetti

The colour revolution of the mid-nineteenth century led to a cultural fascination with the bright hues produced by synthetic dyes across Europe and subsequently in America.² This phenomenon inspired new consumer desires, leading to an increased demand for gaudy colours in textiles, fashion, interior design and various other aspects of social and urban life, ultimately transforming the visual culture of the time.³ These synthetic dyes—marked by their vibrancy, durability and chemically distinct properties—played a crucial role in this transformation, as they were not

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- 1 This chapter is based on research undertaken for my doctoral thesis (defended in 2019), forthcoming as *Chromomentalisme. Art et Psychologie de la couleur en France: 1870-1914* (Dijon: Les presses du réel, 2026). In particular, the discussions on the dialectics between the colour revolution and psychological theories of colour, the cultural impact of hysteria, kleptomania and Vallotton's triptych, as well as the pharmakon-like nature of colour and chromotherapy all derive from and elaborate upon that earlier work.
 - 2 See Regina Lee Blaszczyk, *The Color Revolution* (Cambridge, MA: The MIT Press, 2012), pp. 1–44; and *Colour Revolution. Victorian Art, Fashion & Design*, ed. by Charlotte Ribeyrol, Madeline Hewitson and Matthew Winterbottom (Oxford: Ashmolean Museum, 2023).
 - 3 The association between 'gaudy colours' and fashion was already common before the industrial colour revolution, but these colours proliferated especially in modiste's shops. See Edward Dayes, *The Works of the Late Edward Dayes. Containing an Excursion Through the Principal Parts of Derbyshire and Yorkshire, With Illustrative Notes* (London: T. Malden, 1805), pp. 308–09.

only visually striking but also embodied the industrial and technological advancements of the period. As a result of this revolution, the aesthetic landscape underwent significant changes, with vivid and bold colours becoming emblematic of modernity. This shift was not merely an aesthetic one; it was rooted in the materiality of colour itself. The proliferation of artificial dyes not only influenced individual choices in private and public spaces, but also contributed to a broader cultural narrative that celebrated innovation and the experience of colour in everyday life.

Therefore, the second half of the nineteenth century marked a significant reconfiguration in the epistemological understanding of colour, as both its material form and perception underwent heightened scientific examination.⁴ The very material qualities of colour, from the chemical composition of dyes to their lasting impact on the environment, were subjects of growing interest. Indeed, the spread of these vivid hues raised questions about how the sensory experience of colour could affect mental and physical capacities. Psychological and physiological investigations were undertaken in the emerging field of experimental psychology, exploring not only colour perception, but also the pathological conditions caused by exposure to this new colourful environment.⁵ Psychologists investigated the spread of colour hysteria, especially in connection with consumer culture.⁶ If, on the one hand, an overload of colour stimuli was believed to produce intense nervous and physical responses, often linked to pathological conditions, colour was also presented as possessing potential healing properties through its purported therapeutic effects. This ambivalence can be found in the Platonic and Aristotelian origin of the concept of *chroma* (Greek: χρώμα), described in material terms as *pharmakos* (Greek: φαρμακός), which means at the same time tincture, drug (or poison) and medicine (beneficial remedy).⁷ I argue that the obsession with colour in the

4 Giulia Simonini's essay in this volume traces the impact of science on changing understandings of colour theory.

5 On the rise of experimental psychology, see George Mandler, *A History of Modern Experimental Psychology: From James and Wundt to Cognitive Science* (Cambridge, MA: The MIT Press, 2007).

6 On hysteria in *fin-de-siècle* culture, see Mark S. Micale, 'Discourses of Hysteria in Fin-de-Siècle France', in *The Mind of Modernism. Medicine, Psychology, and the Cultural Arts in Europe and America 1880–1940* (California: Stanford University Press, 2004), pp. 71–92.

7 See Jacqueline Lichtenstein, *La couleur éloquente, rhétorique et peinture à l'âge classique*

cultural context of the *fin-de-siècle* relates to its polyvalent nature and to its ambiguous psychological power as either a cause of disease or a form of cure. Drawing on examples from different media, this chapter addresses some interdisciplinary questions about colour, visual culture and fashion, particularly those arising from art history, colour studies and the history of psychology. It thereby emphasises colour's role as both a cultural phenomenon and a psychological catalyst, illuminating the complex ways in which it transformed the visual and sensory landscape of the era.

A Revolution in Colour

From the mid-nineteenth century, the industrial war between England, France and Germany led to the aniline revolution, that is, to the invention and fabrication of new artificial chemicals, cheaper, brighter and more functional than natural dyes.⁸ As the holder of the most significant collection of aniline dyes, the Dye Collection at Technische Universität Dresden stands as a testament to the expertise and scientific knowledge involved in the production and dissemination of synthetic colours across Europe.⁹ Following the invention of mauveine in 1856 by British chemist William Henry Perkin, modern chemistry focused broadly on the production of synthetic dyes for the textile industry, whose greatest marketing potential lay in their dazzling effect and low price.¹⁰ The prevalence of coloured garments and accessories in Europe can be traced

(Paris: Flammarion, 1989), p. 54; Charles A. Riley II, *Color Codes. Modern Theories of Color in Philosophy, Painting and Architecture, Literature, Music, and Psychology* (Hanover, NH: University Press of New England, 1995), pp. 64–6, https://archive.org/details/isbn_9780874516715.

- 8 Aniline is a toxic organic compound, first isolated from indigo by Otto Unverdorben, who called it 'Crystallin', in 1826. For an account of the chemical and industrial history of artificial dyes, see Anthony S. Travis, *The Rainbow makers: The Origins of the synthetic dyestuffs industry in Western Europe* (Bethlehem: Lehigh University Press, 1993).
- 9 *Dye Collection*, Technische Universität, Dresden, Germany, <http://hdl.handle.net/20.500.12434/570ba96d>. The photograph is my own. The Dye Collection houses over 20,000 trade patterns of synthetic dyes from more than 80 industrial producers. On the collection, see H. Hartmann and K. Vincenz, *Die Farbstoffsammlung, in Sammlungen und Kunstbesitz* (Dresden: Technische Universität, 2022), pp. 57–68.
- 10 On Perkin's mauveine and its applications, see Simon Garfield, *Mauve. How one man invented a colour that changed the world* (New York and London: Norton and Company, 2001).

back to the early modern period, when innovative organic dyes increased their accessibility, even if they remained far from widely available prior to the advent of aniline dyes.¹¹ The challenge for modern chemistry was to develop less expensive dyes which not only exhibited remarkable vibrancy and boldness that would captivate consumers, but also possessed the necessary stability for dyeing fabrics. In 1874, in an article published in *The Revue des deux mondes*, the scientist Rodolphe Radau examined the kaleidoscopic phenomenon of aniline dyes derived from coal tar:

We can no longer count the means imagined by chemists from all countries to derive new colouring matters from aniline and homologous bases [...]. Aniline is like a kaleidoscope that you just have to touch to see unexpected groupings of atoms and colours you were not looking for. After the various purples, reds and blues, we found aniline greens, yellows and browns, and aniline black [...]. Unfortunately, these colours, which are so frank and so brilliant, have a common defect: they lack solidity.¹²

Radau highlighted the intense consumer fascination, particularly among women, with acquiring new, vibrantly coloured clothing each season, even at the expense of fabric quality:

This defect is perhaps not very significant for the use to which they are put, because they are used above all to dye fragile fabrics intended for women's toilettes, which do not last as well as men's clothing; it follows that the colour lasts as long as the fabric. It is a sign of the times that in general the buyer seeks brilliance and cheapness rather than solidity; these fleeting colours, beautiful and quickly faded like flowers which only last one spring, respond to the taste of the public. We are nevertheless concerned with making them more stable: the more solid shades drive their confident and unstable rivals from the market, and the incessant improvement of manufacturing processes makes it certain that this last difficulty will eventually be overcome as all the others have been.¹³

Synthetic dyes enabled the emergence of a new sensorium, popularising intense hues in fashion among the masses and causing an overwhelming

11 See *A Revolution in Colour. Natural Dyes and Dress in Europe, c. 1400–1800*, ed. by Giorgio Riello, Maria Hayward and Ulinka Rublack (London: Bloomsbury Publishing, 2024).

12 Rodolphe Radau, 'Les nouvelles couleurs dérivées du goudron de houille', *Revue des Deux Mondes*, 4 (1874), 892–916 (p. 904). The translation is my own.

13 *Ibid.*

sensorial abundance of colourful options.¹⁴ Women's dresses served as an ideal showcase for these vivid colours, particularly as the trimmings often complemented the gown's hue. A range of garments and accessories from the 1860s to 1880s, held in the collection of the Victoria and Albert Museum (V&A), demonstrates the extent of colour saturation that could be achieved through artificial dyes, particularly in primary and secondary hues such as red, yellow, blue, purple and magenta.¹⁵ The main characteristic of these colours was indeed their extreme level of intensity, which was clearly aimed at attracting a large number of new consumers. However, one specific dye, called fuchsine, stood out as the one that achieved levels of brightness that had never been seen before with natural dyes.¹⁶ The French chemist Michel-Eugène Chevreul clearly stated in a note to the Academy of Science published in 1860 that no other colourant used to dye silk that he knew of could be compared to fuchsine in terms of 'brilliance, intensity and purity of colour'.¹⁷ Chevreul was probably referring to garments similar to the silk, satin and lace walking dress (c.1866–1868) in the collection of the Philadelphia Museum of Art.¹⁸ The materiality of the fabric, in

14 On the concept of sensorium, see David Howes, *Sensorium: Contextualizing the Senses and Cognition in History and Across Cultures* (Cambridge: Cambridge University Press, 2024).

15 For example, *Pair of Boots* (1860s–1870s), bright yellow satin boots with applied black silk braid, black laces, small heels, pointed toes and leather soles (London: V&A, inv. T.588&A-1913, <https://collections.vam.ac.uk/item/O76685/pair-of-boots-unknown/>); *Pair of Boots* (1865–1875), scarlet ribbed silk trimmed with cream bobbin lace and crimson silk ribbon, and lined with white kid (London: V&A, inv. T.180&A-1984, <https://collections.vam.ac.uk/item/O76688/pair-of-boots-unknown/>); *Dress* (c.1869–1870) in silk with bodice, jacket, skirt, peplum and bow, made of magenta-coloured ribbed silk trimmed with satin (London: V&A, inv. T.118 to D-1979, <https://collections.vam.ac.uk/item/O115837/dress-vignon/>); *Day Dress* (c.1870–1873) in purple aniline dyed silk, lined with cotton, trimmed with satin and bobbin lace, reinforced with whalebone (London: V&A, inv. T.182&A-1914, <https://collections.vam.ac.uk/item/O13846/day-dress-unknown/>); *Day Dress* (c. 1873) in silk, coloured with synthetic dyes belonging to the methyl violet and aniline blue, given by the Marchioness of Bristol (London: V&A, inv. T.51&A-1922, <http://hdl.handle.net/20.500.12434/00c1c15a>).

16 Fuchsine is a purplish-red dye, named by the Lyon-based manufacturer Renard frères et Franc in 1859, after the fuchsia flower.

17 Michel-Eugène Chevreul, 'Note sur les étoffes de soie teintes avec la fuchsine et réflexions sur le commerce des étoffes de couleur', *Compte Rendu Académie des Sciences*, LI (16 July 1860), 73–9 (p. 74). The translation is my own.

18 *Woman's Dress: Bodice, Skirt, and Belt*, ca. 1866–1868, magenta silk satin with black silk satin and black cotton lace, Philadelphia Museum of Art, inv. 1997-80-1a—c, <http://hdl.handle.net/20.500.12434/c109943d>.

this case silk, also plays a role in reinforcing the glow and intensity of the chromatic effect. The vibrant shades of pink, created using fuchsine dye in the textile industry, became one of the fashion trends for women during the second half of the nineteenth century.¹⁹

From the 1860s onwards, popular fashion magazines (such as *La Mode illustrée*, *Le Moniteur de la mode*, *Englishwoman's Domestic Magazine*, *Woman's World* and *Harpers's Bazaar*) and global trendsetters played a significant role in popularising new synthetic colour trends for women's dresses, including mauve, emerald green, magenta and Eiffel red. For instance, in 1890, Oscar Wilde's fashion magazine *Woman's World* discussed the passion for a new shade of red in fashion, known as 'Eiffel red' ('*rouge Eiffel*'). The name, which was obviously coined for commercial purposes, was inspired by the 'terra-cotta' red colour of the Eiffel Tower, built between 1887 and 1888 for the 1889 Paris Universal Exposition.²⁰

Colourful dresses were captured in various media, such as paintings, photography and fashion prints, thus enabling the colour mediatization of fashion. By using aniline dyes for colouring, this popular imagery competed with the chromatic intensity of the actual clothing. In particular, fashion prints and photographs were hand-coloured using artificial dyes, as was probably the case for John Jabez Edwin Mayall's picture of Queen Victoria wearing a purple dress (1861, National Portrait Gallery, London).²¹ The choice of purple was certainly a consequence of the mauve mania of the time, considering the fact that Queen Victoria had contributed to making this shade fashionable when she wore a mauve dress to her daughter's wedding in 1858.²²

Contemporary artists such as the Impressionists used bright and

19 On pink in the history of fashion, see the catalogue of the exhibition held at Fashion Institute of Technology, *Pink: The History of a Punk, Pretty, Powerful Color*, ed. by Valerie Steele (New York: Thames & Hudson, 2018). On Fuchsine, see Alessandra Ronetti, *Fuchsine and Fashion: a Bright Pinkish Trend* (Chromobase, 2023), <https://chromobase.huma-num.fr/narratives/fuchsine-and-fashion-a-bright-pinkish-trend/>.

20 See Masque de Velours, 'Paris Fashions', *Woman's World*, 3 (1890), 29–31.

21 John Jabez Edwin Mayall, *Queen Victoria*, 1861, hand-coloured albumen paper photograph (carte de visite), 8.9 x 5.8 cm, National Portrait Gallery, London, inv. NPG Ax46706, <http://hdl.handle.net/20.500.12434/fd9f2888>. On fashion prints, see Vyvyan Holland, *Hand Coloured Fashion Plates 1770 to 1899* (Boston: Boston Book and Art shop, 1955).

22 See Lee Blaszczyk, *The Color Revolution*, p. 22.

vivid colours in their works to show the liveliness of clothing.²³ In fact, Impressionism emerged precisely during a period characterised by the exploration, celebration and critique of newly developed synthetic pigments. One example is Pierre-Auguste Renoir's painting *La Parisienne* (1874, Cardiff Museum), which depicts a young woman in a blue-indigo ruffled dress, probably made using a synthetic ultramarine blue pigment.²⁴ Set against a background of grey-yellow, mauve and blue shades, the woman is looking at the viewer while she puts on her gloves. The brightness of the dress is reinforced by the neutral tones of the background, producing a physiological effect on the viewer similar to that of looking at a real brightly coloured dress in the greyish streets of Paris.

Bright Colours and Hysteria

Artificial colours, such as fuchsine, reached levels of brightness and boldness never seen before, but the effects of overstimulation and nervous fatigue produced by this new multicoloured environment also multiplied.²⁵ Many sources from the time described a real sensory shock caused by these gaudy colours and criticised their spread in fashion and urban experiences. One such source was the French philosopher Hippolyte Taine, who referred to the colours of the dresses he saw in the streets of London as 'showy' (meaning excessively bright) in his book *Notes on England*, in 1872:

There were many violet dresses, one being of a wild violet clasped round the waist with a golden band, which would have made a painter cry out. I said to a lady, "The toilette is more showy among you than in France." "But my dresses come from Paris!". I carefully refrained from replying, "But you selected them."²⁶

23 On the links between Impressionism and fashion culture, see *Impressionism, Fashion & Modernity*, ed. by Gloria Lynn Groom (Chicago: Art Institute of Chicago, 2012).

24 Pierre-Auguste Renoir, *La Parisienne*, 1874, oil on canvas, 163.2 x 108.3 cm, National Museum of Wales, Cardiff, inv. NMW A 2495, <http://hdl.handle.net/20.500.12434/8bde1a21>.

25 The concept of nervous fatigue was introduced for the first time by German physiologist Hermann von Helmholtz in *Handbuch der physiologischen Optik* (1856–1867), but it was linked to modern urban life by American neurologist George Miller Beard in 1869 ('Neurasthenia, or nervous exhaustion', *The Boston Medical and Surgical Journal*, 80 (1869), 217–21).

26 Hippolyte Taine, *Notes on England*, trans. by William Fraser Rae, 1872 (New York:

How did the spread of these new ‘showy’ colours—as Taine referred to them—influence the perception of colour and affect the mental and bodily capacities of the contemporary viewer? The fields of psychophysiology and experimental psychology, which emerged around the same time as the colour revolution, tried to answer this question by testing not only colour perception, but also the madness (in psychiatric terms) derived from exposure to the new sensorium.

Neurologist Jean-Martin Charcot, renowned for his work on hysteria,²⁷ used colour to test the sensory and mental capacities of his neuropathic patients. In his experiments on hypnosis and suggestive states, he used a magic lantern to project coloured lights directly onto the bodies of ‘hysterical’ patients, reflecting the contemporary belief that the body responds with a nervous reaction to colour stimulation, as illustrated in popular imagery of the time.²⁸ The use of artificial light projection reinforced the effect of brightness, which Charcot considered one of the key elements for producing a sensory shock. In the same period, French psychiatrist Charles Féré, who worked with Charcot at the Salpêtrière Hospital in Paris, studied the impact of colour on hysteria, using a device called the dynamograph to examine the physiological reactions of the body under the influence of coloured light.²⁹ He recorded the chromatic ‘sensation’ with a graphic method showing the increase or decrease in bodily energy when exposed to the stimuli of different coloured lights, demonstrating that red is the most exciting colour, while blue or purple have a relatively soothing effect. Interpreting colour as an energetic

Henry Holt and Company, 1885), p. 23. See also another passage: ‘They like a gaudy show, an illumination in coloured glass, women in full dress, showy and variegated dresses, white shawls embroidered with red flowers and exotic birds’, *Ibid.*, p. 46. The word ‘showy’ is used also in the original French edition (*Notes sur l’Angleterre* (Paris: Hachette, 1872).

27 See the classic French book written in 1882 by Georges Didi-Hubermann, *Invention of Hysteria: Charcot and the Photographic Iconography of the Salpêtrière*, trans. by Alisa Halt (Cambridge, MA: The MIT Press, 2004). The bibliography on Charcot and hysteria is quite large, although the topic of colour is rarely addressed.

28 S.T., *Catalepsie produite sous l’influence de la lumière électrique – Cours de M. Charcot*, in Adolphe Cartaz, ‘Du somnambulisme et du magnétisme. À propos du Cours du Dr. Charcot à la Salpêtrière’, *La Nature*, 18 January 1879, 102–106, <http://hdl.handle.net/20.500.12434/0ffd4996>.

29 See Charles Féré, *Sensation et mouvement: études expérimentales de psycho-mécanique* (Paris: F. Alcan, 1887).

stimulus, Féré discussed what he called the ‘psycho-motor’ power of colour to excite the body. He stated that colour provokes ‘a general erection of the entire body’.³⁰

Numerous tests involving colour in experimental psychology, conducted in both Europe and America, used rotating devices similar to *Newton’s disc* (c. 1850), now part of the collection of the Museu del Cinema in Girona.³¹ In 1892, a photograph captured the Laboratory of Experimental Psychology at Harvard University, which was led by the German-American psychologist Hugo Münsterberg.³² The image showcases the instruments used, including coloured rotating discs and magic lanterns, providing a glimpse into the research practices of the period.³³ Indeed, vibrant colours, combined with movement, were deemed highly effective in capturing attention and potentially inducing hypnotic effects in observers. Consequently, psychologists often utilised the projections of a chromatope—a nineteenth-century animated slide for magic lanterns painted with vivid artificial colours and geometric patterns—within experimental studies.³⁴

Towards the end of the century, psychologists and psychiatrists began using chemicals from the dye industry, which also supplied colours for the fashion and textile industries, to study how people perceive colour. Notably, Édouard Toulouse, who served as the Director of the Laboratory of Experimental Psychology at École des Hautes Études, carried out examinations on visual sensitivity to colour (*‘acuité de la sensibilité visuelle à une couleur’*) by utilising aniline dyes produced by the Society of Colouring Matters of Saint-Denis (*Société des matières*

30 *Ibid.*, p. 14.

31 *Newton’s Disc*, c.1850, Museu del Cinema, Girona, Spain, inv. 00879, <http://hdl.handle.net/20.500.12434/93d3bc39>.

32 See Hugo Münsterberg, *Psychological Laboratory of Harvard University* (Cambridge, MA: Harvard University Press, 1893).

33 *Hugo Münsterberg’s Laboratory of Experimental Psychology, Dane Hall—colour discs and magic lanterns*, 1892, photograph, Harvard University Archives, HUPSF Psychological Laboratories, https://museudelcinema.girona.cat/eng/colleccio_objectes_fitxa.php?id=7704.

34 See Alessandra Ronetti, ‘Fasciner l’attention. Le chromatope et le pouvoir suggestif de la couleur en France au XIX^e siècle’, *Transbordeur. Photographie, Histoire, Société*, 1 (2017), 134–49.

colorantes de Saint-Denis), situated outside Paris.³⁵ To test his subjects, he presented them with a sequence of hues in small containers, created by mixing various anilines with distilled water to replicate the full range of the colour spectrum (from violet to red).³⁶ Toulouse viewed this test as more scientifically trustworthy than others, because he used the original coloured materials from the dye industry rather than the coloured wools that psychologists usually received from the Gobelins Manufactory (the historic tapestry factory) to test colour perception.³⁷

Dazzling Displays and Consumer Culture: Vallotton's *Bon Marché* (1898).

Psychologists also examined emerging pathologies associated with colour in consumer culture, especially the ways in which bright colours combined with artificial lighting were held responsible for new forms of kleptomania reportedly affecting women in department stores.³⁸ Since the 1860s, department stores had begun to grow in popularity, providing women with a wider selection of products at set prices.³⁹ The

35 See Édouard Toulouse, *Technique de psychologie expérimentale, examen des sujets; avec la collaboration de N. Vaschide et H. Pieron* (Paris: Octave Doin, 1904), pp. 83–86. The reference is to the *Etablissements Poirrier et Dalsace*.

36 *Ibid.*, p. 84.

37 'We had to leave aside the many techniques proposed by various authors, and in which the coloured bodies and the conditions of their vision were not sufficiently defined. This criticism applies in particular to the wools manufactured by the Gobelins national factory which, given the impression of their alterations, present a value that is artistic rather than scientific'. *Ibid.*, p. 83 (The translation is my own). For example, the director of the Physiological Psychology laboratory at the Sorbonne, Alfred Binet, a student of Charcot, carried out a whole series of tests on the link between attention and colour memory using the 'Gobelins collections of wool spools' ('collections de bobines de laine des Gobelins'). See Alfred Binet, *Introduction à la psychologie expérimentale; avec la collaboration de MM. Philippe, Courtier et V. Henri* (Paris: Félix Alcan, 1894), p. 5.

38 The relationship between civilisation and pathology was referenced by a growing number of psychologists at the time. They warned that the increase in nervous disorders was linked to the sensory overstimulation common in *fin-de-siècle* society. See Charles Féré, 'Civilisation et névropathie', *Revue Philosophique de la France et de l'Étranger*, 41 (1896), 400–13.

39 See especially Lisa Tiersten, *Marianne in the Market: Envisioning Consumer Society in Fin-de-Siècle France* (Berkeley: University of California Press, 2001); *La naissance des grands magasins: 1852–1925, mode, design, jouets, publicité*, ed. by Amélie Gastaut

colourful display of items was intended to capture women's attention in particular, as medical writings of the period suggested they were more susceptible to commercial hysteria.⁴⁰ Presented as a symptom of nervous fragility, kleptomania is in fact a social construct that reflects patriarchal anxieties concerning the control and regulation of female bodies.⁴¹

In the *Bon Marché* (1898),⁴² Swiss artist Félix Vallotton represented this pathologisation of sensory experience through consumer culture (See Figure 5.1). The Bon Marché, originally a novelty shop selling textiles, was transformed into a department store by entrepreneur Aristide Boucicaut in 1852, and by the end of the century it had become a symbol of bourgeois culture.⁴³ Vallotton's triptych depicts the entrance of the Bon Marché during a promotional event, where a crowd gathers to admire the dazzling displays. The success of the store was also captured by Émile Zola in the novel *Au Bonheur des dames* (*The Ladies' Paradise*), published in 1883.⁴⁴ Zola describes the impact of the newly designed shop windows, particularly through the perspective of the protagonist Denise, whose gaze is captivated by the array of displays. Zola wrote of the entrance: 'There was, under the diffuse light, a display made up of bright and gay colours, which produced a ravishing effect'.⁴⁵

(Paris: Musée des arts décoratifs, 2024).

- 40 On the neurotic nature attributed to women in the mid-nineteenth-century medical tradition, see Charles François Menville, *Histoire médicale et philosophique de la femme*, vol. 1 (Paris: J.-B. Baillière et fils, 1858), p. 18. On shoplifting and the hysteria attributed to women in relation to shopping, see, for instance, Pierre Giffard, *Paris sous la Troisième République: les grands bazars* (Paris: Victor Havard, 1882), pp. 152–68.
- 41 To contextualise the issue, see in particular Patricia O'Brien, 'The Kleptomania Diagnosis: Bourgeois Women and Theft in Late Nineteenth-Century France,' *Journal of Social History*, 17 (Autumn 1983), 65–77; Elaine S. Abelson, 'The Invention of Kleptomania,' *Signs: Journal of Women in Culture and Society*, 15.1 (Autumn 1989), 123–43.
- 42 For a general account of the painting, see Félix Vallotton, 1865–1925: *l'œuvre peint*, ed. by Marina Ducrey (Lausanne: Fondation Félix Vallotton, 2005, II), pp. 116–17 (n. 212).
- 43 See especially Michael B. Miller, *The Bon Marché: Bourgeois Culture and the Department Store, 1869–1920* (Princeton: Princeton University Press, 1981).
- 44 The original French publication, *Au Bonheur des Dames* (translated as *The Ladies' Paradise*), constitutes the eleventh installment in Émile Zola's Rougon-Macquart series. This novel was first serialised in the magazine *Gil Blas* and subsequently released in book format by the publisher Charpentier in 1883.
- 45 Émile Zola, *The Ladies' Paradise* (London: Vizetelly & Co., 1886), p. 216.



Fig. 5.1. Félix Vallotton, *Le Bon Marché*, 1898, oil on cardboard, triptych, central panel: 70 x 100 cm, side panels: 70 x 50 cm, private collection.

Vallotton's *Bon Marché* represents a symbol of the culture of hysteria that emerged towards the end of the century as an iconic phenomenon, popularised by the publication of Max Nordau's book *Degeneration* (*Entartung*) in 1892.⁴⁶ The *flâneur* and, especially, the *flâneuse* became increasingly associated with Charcot's patients, who were thought to exhibit signs of hysteria.⁴⁷ Indeed, Vallotton's three paintings explore the hypnotic experience of displays, which exploit the dazzling colours of the goods to induce customers to purchase. The central picture depicts an indistinct crowd, especially women, with faces distorted under artificial lighting, attracted by the decoration with its multicoloured festoons and vivid lights. The composition is designed to show the hypnotic movement of the crowd, from the centre of the staircase to the sides. It also emphasises the contrast between the dark tones of the masses of customers at the entrance and the bright colours of the displays, accompanied by signs.

The two side paintings offer a close-up view of the shopping experience. The shelves are filled with brightly packaged products arranged by colour. A variety of gloves, fabrics and umbrellas in red,

46 See Max Nordau, *Degeneration* (New York: D. Appleton, 1895). It was translated into English by Howard Fertig, based on the second German edition of the text. The text provided a popular account of French theories on hypnosis, suggestion and hysteria developed by Jean-Martin Charcot and his students. Félix Vallotton was closely associated with the milieu of *La Revue Blanche*, drawing influence from theories on hypnosis and hysteria that emerged from French psychophysiological studies.

47 See, for instance, Jules Claretie, *La Vie à Paris* (Paris: Victor Havard, 1881), p. 130.

yellow, blue and green are also organised by hue. In the painting on the right, a woman is seen from behind, likely engaged in shopping. On the left-hand panel, a seller appears to be showing the price of a lipstick to a woman in gloves who is holding it. The red lipstick serves as a counterpoint to the woman's hat, which is adorned with an artificial red flower, representing the only colourful details that stand out on the right. Both figures are dressed in black, highlighting the opposition between them and the colourful, illuminated objects nearby on the left. The pathologisation of the shopping experience is shown through the contrasts between black and bright colours, the erased faces of the customers, and the automatic reactions elicited by the captivating displays. The intensity of the colours generates not only a visual response, but also a tactile impulse.

At the time, criminal psychology interpreted the increase in shoplifting at department stores as being linked to these displays, which were considered to exert a mesmerising effect on shoppers. An article written by criminologist Alexandre Lacassagne and published in the *Revue d'hypnotisme et de la Psychologie Physiologique* pointed out the connection between such hypnotic displays in department stores and the rise of criminal pathologies such as kleptomania.⁴⁸ He wrote:

Shoplifting in department stores has taken on real importance in our time due to its increasing frequency, the value and variety of the objects stolen, and the quality of the people responsible for these thefts.

[...] These provocative displays are therefore one of the factors in shoplifting. They are made to excite desire. This is the implementation of a *trompe-oil*. It is necessary to fascinate the clients, to dazzle them, to provoke their desire and to do this through a disturbing display. The displays are social stimulants which could be called *aperitifs of crime*.⁴⁹

Department stores actually competed to create the most impressive and eye-catching displays and opportunities for window shopping, even though that might lead to more shoplifting. The aim of fashion window dressers was to dazzle customers with vibrant and primary hues in order to evoke a tactile desire for the items and subsequently stimulate a purchasing impulse. The spread of electric lighting during the 1880s

48 Alexandre Lacassagne, 'Les vols à l'étalage et dans les grands magasins', *Revue d'hypnotisme et de la Psychologie Physiologique* (September 1896), 76–82.

49 *Ibid.*, pp. 76–78. The translation is my own.

contributed to placing an even greater emphasis on the brightness of the products, accentuating their impact on consumers.⁵⁰ In fact, women were considered particularly sensitive to the displays to the extent that they would be influenced to make purchases or, in some instances, even engage in kleptomaniac behaviours, consequently becoming thieves.⁵¹ Vallotton depicts the suggestibility of the crowd and the tactile impulse that the brightly coloured displays exert, especially on women, who are the main subjects in the two side paintings.

Lacassagne's article also provided accounts of women suffering from kleptomania and investigated the relationship between shoplifting and their mental state. The aim of the study was to categorise shoplifters into three analytically defined groups: collectors, unstable individuals, and those with mental illness.⁵² According to the cited statistical findings, criminal psychology considered women who were 'hysterical', alcoholics, 'neurasthenic' or pregnant to be particularly vulnerable to the influence of displays, thereby increasing their likelihood of engaging in kleptomaniac behaviour.⁵³ In *Au Bonheur des dames*, Zola—probably influenced by the criminal psychology of the time—described the kleptomania afflicting women in department stores due to the glowing colours. Zola depicted the shop windows as a visual delight for all passers-by; however, he also portrayed them as a potential source of mental disorientation for women who found themselves bewildered by the vibrant hues of the department stores' displays.⁵⁴ The displays would captivate the nervous sensibilities of the customers to such an extent that Zola emphasised the increase in shoplifting:

50 See P. Clémenceau, 'Les nouvelles installations d'éclairage électrique dans les magasins de Paris', *La Lumière électrique*, 11.4 (26 January 1884), 197–202.

51 On the increase in shoplifting in department stores, see the chapter 'Les vols – L'inventaire', in Georges d'Avenel, *Le Mécanisme de la vie moderne* (Paris: Arman Colin, 1896), pp. 68–79; Paul Dubuisson, *Les voleuses de grands magasins* (Paris: A. Storck, 1902).

52 Lacassagne, 'Les vols à l'étalage et dans les grands magasins', p. 79.

53 *Ibid.*

54 Zola, *The Ladies' Paradise*, p. 69: 'It was for women that all the establishments were struggling in wild competition; it was women that they were continually catching in the snare of their bargains, after bewildering her with their displays. They had awakened new desires in her flesh; they were an immense temptation, before which she succumbed fatally, yielding at first to reasonable purchases of useful articles for the household, then tempted by their coquetry, then devoured.'

In the first place, there were the professional thieves; these women did the least harm of all, for the police knew every one of them. Then came the kleptomaniacs, who stole from a perverse desire, a new sort of nervous affection which a mad doctor had classed, proving the results of the temptation provided by the big shops. In the last place must be counted the women in an interesting condition, whose robberies were of a special order. For instance, at the house of one of them, the superintendent of police had found two hundred and forty-eight pairs of pink gloves stolen from every shop in Paris.⁵⁵

The connection between kleptomania and visually striking displays suggests the tactile and automatic reactions that vividly coloured merchandise was thought to elicit. Vallotton's painting effectively illustrates this involuntary impulse, as well as the hypnotic nature of the display described by Zola, which was categorised by criminal psychology in relation to various pathologies. In his triptych, Vallotton reflected on the tactile quality of the colourful merchandise in two ways. First, the consumers represented in the paintings appear to experience a tactile and bodily response to the merchandise, as seen in the lipstick sale scene and in the animated gestures of the customers in the central panel. The garish colours of the products attract attention and are understood to provoke automatic behaviours or, occasionally, even criminal acts. On another level, the coloured objects painted by Vallotton, with their vibrant hues, seem to invite a sensory response from the viewer, drawing them into a parallel experience to that of the consumers depicted in the scene. This visual engagement with the brightly coloured objects mirrors the consumer's tactile interaction with the merchandise, creating a shared experience, even if only visually. In this way, the viewer is indirectly assimilated into the role of the suggested consumer.

Chromocure

As we have seen, *fin-de-siècle* psychology suggested that exposure to too many bright colours could trigger strong mental and bodily reactions, potentially leading to issues like kleptomania. However, colour was also seen as a way to help treat these problems and calm the mind, thanks to

⁵⁵ *Ibid.*, p. 226.

its supposed healing properties.⁵⁶

Despite the characterisation of the late nineteenth century by art historian John Gage as the 'era of chromotherapy', there has been a notable lack of critical attention directed towards the cultural influence of these popular treatments.⁵⁷ Chromotherapy—a widespread treatment since the 1870s, involving immersive atmospheres created by colour-light baths, painted walls and coloured objects—became a fashionable *fin-de-siècle* bourgeois practice as a form of rest from the nervous fatigue connected with modern life.⁵⁸ This practice was seen as a way to manage and control the psychological reactions and pathologies deriving from the colour sensorium analysed here.

While the beneficial action of the sun's thermal rays has always been acknowledged, what changed in epistemological terms during the second half of the nineteenth century was the interpretation of chromotherapy as a form of 'body technique'.⁵⁹ Indeed, this was related to a psychological turn occurring in the practices and discourses on colour in the medical field from the beginning of the 1870s, and was based on a reformulation of colour perception as a sensory experience. Since nineteenth-century psychophysiology (for example, the work of Hermann von Helmholtz, Jean-Martin Charcot and Charles Féré) considered colour perception to be a mental process related to the body, and one connected to all the senses in a synaesthetic experience, the idea that colour and light radiation could have an emotional and physical impact became quite widespread, both in Europe and America.

56 For a summary of these nineteenth-century practices, see the popular handbook of Albert Osborne Eaves, *The Colour Cure. A Popular Exposition of the Use of Colour in the Treatment of Disease* (London: W. Foulsham and Co., 1901).

57 John Gage, *Color and Meaning: Art, Science and Symbolism* (Berkeley: University of California Press, 1999), p. 265.

58 This treatment consists in exposing the body to a coloured environment, created by the projection of coloured lights or using coloured elements (e.g., objects, clothing, steam, devices). The source of light can be natural—that is, on the spectrum of electromagnetic radiation—or artificial. In the medical tradition of magnetism, references to the therapeutic effects of colours can be traced back to the first half of the nineteenth century, as evidenced by Antoine Despine, *De l'emploi du magnétisme animal et des eaux minérales dans le traitement des maladies nerveuses* (Paris: Baillière, 1840). Despine specifically studied the connection between sensitivity to colours and nervous disorders, observing the fatiguing effects of both red and violet (p. 64).

59 On the concept of 'body technique', see Marcel Mauss, 'Techniques of the Body', in *Incorporations*, ed. by Jonathan Crary and Sanford Kwinter (1934; reprint, New York: Zone, 1992), 455–77 (p. 455).

Medical and parapsychological texts on the healing power of colour multiplied during the 1870s and 1880s, in parallel with the growing popularity of American doctors, who exposed neuropaths to sunlight in appropriate greenhouses (*solaria*).⁶⁰ The US General Augustus Pleasonton conducted research on the effect of violet light on the development of plants, and the soothing influence of blue light.⁶¹ Inspired by Pleasonton, Giuseppe Ludovico Ponza, a physician at the Alexandria Insane Asylum in Italy, carried out similar trial investigations to cure manic patients. In 1876, he wrote an essay to explain his treatments: patients were placed in tinting rooms equipped with coloured glass panes positioned in the windows to filter the natural light.⁶² For example, he used a red room for cases of depressive delirium, while a blue room was set up to soothe very agitated patients.

The application of these experiences to the home led to the development of chromatic ambiances created with the help of coloured glass windows, which became a trend in interior design.⁶³ This trend is clearly depicted in Seth Pancoast's occultist treatise *Blue and Red Light* (1877).⁶⁴ Two images portray a well-dressed woman lying on a sofa in a bourgeois living room struck by the exciting action of red light in one case, and by the calming effect of blue light in the other. The illustrations show how this domestic practice shaped chromotherapy into a sensory experience that affected the body throughout the day, and according to the needs of each individual. As we have seen, the supposed healing power of colours was used to treat various pathologies, such as hysteria, melancholy or depression. Doctors not only offered treatments in their clinics, but also instructed their patients on how to rest from urban fatigue by changing the colours used in the decoration of their homes.

60 On the popularisation of these theories in Europe, see Augustin Cabanès, *Remèdes d'autrefois: comment se soignaient nos pères* (Paris: A. Maloine, 1905), pp. 232–48.

61 Augustus J. Pleasonton, *The Influence of the Blue Ray of the Sunlight and of the Blue Color of the Sky* (Philadelphia: Remsen and Haffelfinger, 1871).

62 Giuseppe Ludovico Ponza, 'De l'influence de la lumière colorée dans le traitement de la folie', *Annales médico-psychologiques*, 15–6 (1876), 20–25.

63 Pleasonton's theories also influenced the interior design of photographic portrait studios during the 1870s: see Tanya Sheehan, *Doctored: The Medicine of Photography in Nineteenth-Century America* (University Park: Pennsylvania State University Press, 2011).

64 'Application of Red Light. Full bath/Partiel, in Seth Pancoast', *Blue and Red Light: Or, Light and its Rays as Medicine* (Philadelphia: J.M. Stottard and Co., 1877), <http://hdl.handle.net/20.500.12434/52f70656>.

Fin-de-siècle medical and psychological advice in popular journals frequently included references on how to use the soothing impact of colour to decorate different rooms.⁶⁵ These rooms were thought of as total environments, since both lighting and the design had to be coloured to achieve the intended result.

Like colour-light baths, clothes were used to affect the body, especially since psychologists insisted on the idea of 'skin sensibility' to colour,⁶⁶ underlining not only its visual and mental effect, but also its therapeutic impact on the skin. As Alison Matthews David notes, the vibrant artificial dyes that revolutionised fashion also posed significant health risks, particularly arsenic green, which caused skin diseases and poisoning.⁶⁷ Despite the toxicity of dyes, various treatises on chromotherapy emphasised the potential health benefits of colour in clothing. For instance, parapsychologist Edwin D. Babbitt pointed out how clothing could affect the body in medical treatments in a section entitled 'The Hygiene of Color in Dress' in his popular handbook, *Principles of Light and Color* (1878).⁶⁸ Notably, Babbitt distinguished between light and dark clothing, pointing out that lighter fabrics enhanced the exposure of the skin to light:

A certain physiologist has declared that he can cure any person of cold by causing him to wear white clothing for two days. The skin and its contiguous nerves being thus made active by the light, the lungs, liver and kidneys are far less burdened, and the external system becomes positive and able to resist noxious influences.⁶⁹

On the one hand, psychologists wrote on fashion in popular magazines to advise women of the negative influence that gaudy colours might have on the nervous system.⁷⁰ On the other hand, coloured dresses

65 See, for example, Edgar Monin, 'Propos du docteur', *Gil Blas* (31 October 1893), 2.

66 See Féré, *Sensation et mouvement*, 14.

67 See Alison Matthews David, *Fashion Victims: The Dangers of Dress, Past and Present* (London: Bloomsbury Visual Arts, London, 2015).

68 Edwin D. Babbitt, *The Principles of Light and Color* (New York: Babbitt and Co., 1878), 365–67.

69 *Ibid.*, p. 366.

70 See François-Victor Foveau de Courmelles, 'Ce que dit le docteur: névroses et couleurs', *La Grande Dame*, 4 (1896), 9–11.

could also be employed as a form of chromotherapy to influence moods and feelings.⁷¹ The popularisation of chromotherapy with its immersive coloured atmospheres concurred with a new epistemological interpretation of colour as an embodied experience.

Expanding beyond the confines of medical clinics, chromotherapy permeated various aspects of daily life, providing a potential remedy for the sensory overstimulation of modernity, which had been intensified by the production of artificial dyes. Its widespread appeal is illustrated by a caricature titled *Chromomanie. La chromothérapie, ou l'art de soigner avec les couleurs*, published in the satirical journal *Pêle-mêle*, which humorously critiques the application of this practice to patients with neurological disorders (see Figure 5.2). The image shows a doctor—a parody of physicians such as Charcot or Féré—using a red flag to cure his depressed and neurotic patients. The patients see the red flag and start reacting with their body language. After that, the doctor receives a red cockade from a minister as a reward for his work. In the end, the doctor himself becomes excited by red, due to the red cockade on his shoulder, and starts jumping for joy like one of his patients.⁷²

The popularity of chromotherapy in the late nineteenth century reflected a broader societal fascination with colour, revealing an obsession that transcends mere aesthetic appreciation. This phenomenon not only highlights the therapeutic claims associated with colour, but also serves as a commentary on the cultural zeitgeist of the time, where the interplay between colour and mental health became a subject of both scientific enquiry and playful satire. The caricature effectively captures the dual nature of chromotherapy, illustrating its role as both a therapeutic approach and a cultural commentary on the era's colour madness.

71 See, for example, Hippolyte Baraduc, *Les Vibrations de la vitalité humaine : méthode biométrique appliquée aux sensitifs et aux névrosés* (Paris: J.-B. Baillière et fils, 1904).

72 Anonymous, 'Chromomanie. La chromothérapie, ou l'art de soigner avec les couleurs est appliquée avec succès aux aliénés...', *Pêle-mêle : journal humoristique*, 15.20 (16 May 1909).



Fig. 5.2. Anonymous, 'Chromomanie. La chromothérapie, ou l'art de soigner avec les couleurs est appliquée avec succès aux aliénés...', *Pêle-Mêle: Journal Humoristique*, 15.20 (16 May 1909).

Conclusion

The nineteenth-century fascination with colour was not merely an aesthetic phenomenon, but a cultural response to the sensory transformations brought about by industrial modernity. The spread of artificial dyes reshaped the visual environment and intensified chromatic experience, prompting new scientific, medical and psychological interpretations of colour's effects on the body and mind. As this chapter has argued, colour in the late nineteenth century was repeatedly framed as *pharmakon*: at once stimulant and sedative, irritant and remedy. The contradiction was not accidental; it was constitutive of colour's cultural meaning. Félix Vallotton's *Bon Marché* crystallises this ambivalence. His triptych does not simply document consumer modernity; it visualises the uncertain

boundary between desire and compulsion, attraction and alienation. By situating Vallotton's paintings within contemporary debates on hysteria, kleptomania and chromotherapy, this chapter has sought to demonstrate that colour functioned as a psychological catalyst in this cultural context. The same bright colours that produced sensory shock in the urban environment were reimagined as tools for restoring equilibrium within domestic interiors and clinical settings. Ultimately, the ambiguity of colour reflects broader anxieties about modernity itself. Industrial progress generated unprecedented visual intensities, and with them new fears about the limits of perception and the body's sensory regulation. In this context, colour became a privileged site through which society articulated concerns about gender, consumption and pathology. From hysteria to healing, colour traversed the boundaries between commerce and clinic, spectacle and therapy. Its polyvalent status—at once material substance, sensory stimulus and symbolic agent—reveals how deeply intertwined aesthetic experience, consumer culture and medical discourse had become. In *fin-de-siècle* culture, colour was never neutral: it acted as a force capable of dazzling, disturbing and, paradoxically, restoring the modern subject.

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PART III

6. Masculinities, Colour, Dyeing and the Design of Tweeds 1829–1914

Fiona Anderson

Introduction

Colour has been a key element within the design of tweeds from the 1830s up until today.

This chapter focuses on interdisciplinary and material culture research into nineteenth-century tweed design, which shows that novel ways of using colour in woollen textile design evolved from the 1830s in Scotland. In that decade, many of what became the key visual characteristics of the ‘family’ of textiles known as tweeds initially developed. The historical and international significance of these colour and design developments is shown by the continued popularity of tweeds within men’s and women’s fashion since the late nineteenth century. This chapter explores the influence of Romanticism, landscape, sport, fashion and gender on the development of the newly colourful Scottish woollen designs for menswear, which by the 1830s had become known as tweeds. It investigates how the significant focus on colour, design, fashionable novelty and high quality in Scottish mill-based tweed manufacturing interconnected with technological changes in dye chemistry between 1858 and 1914.

The term ‘tweed’ is used in this chapter to describe a wide family of woollen cloths that evolved in mainland Scotland from 1829 onwards.¹

1 The origin of the term ‘tweed’ is examined in Fiona Anderson, *Tweed* (London: Bloomsbury Academic, 2017), pp. 7–9. This chapter extends some arguments brought forth in that book and investigates dyeing in the Scottish mill-based tweed

This essay primarily focuses on the centre of that mill-based sector in the Scottish Borders where the colour and design characteristics examined here first emerged. The domestic, handwoven tweed industry that produced Harris Tweed is outside the scope of this chapter because it developed in the later nineteenth century, and the 1930s shift towards the use of artificial dyes in that sector has already been researched by Janet Hunter.² By contrast, the published literature on the history of tweed does not address when synthetic dyes began to be used in the production of these textiles in mainland Scottish mills.³

This chapter is broadly situated within the significantly under-researched fields of wool textiles and design, and textiles and masculinities between 1829 and 1914. It extends the existing literature on artificial dyes, colour and fashion between 1856 and 1914, which has mainly focused on textiles designed for womenswear. That principal focus of research thus far is not surprising, because the new synthetic dyes initially had a more dramatic and widespread impact on silk and cotton fabrics created for the European and American female markets than on wool cloths designed for menswear (extending that field, in this volume Alessandra Ronetti examines the impact of the new sensorium of the aniline dyes on the emerging field of psychology, which often pathologised women).⁴ However, tweeds were originally adopted as

industry for the first time.

- 2 Janet Hunter, *The Islanders and the Orb: The History of the Harris Tweed Industry 1835–1995* (Stornoway, Lewis: Acair Limited, 2001), pp. 27–45.
- 3 Synthetic dyes are not mentioned in E.S. Harrison, *Scottish Woollens* (Edinburgh: The National Association of Scottish Woollen Manufacturers, 1956); T.A. Stillie, 'The Evolution of Pattern Design in the Scottish Woollen Textile Industry in the Nineteenth Century', *Textile History*, 3 (1970), 309–31; Clifford Gulvin, *The Tweedmakers: A History of the Scottish Fancy Woollen Industry 1600–1914* (Newton Abbot: David & Charles, 1973); Kenneth Ponting, 'The Scottish Contribution to Wool Textile Design in the Nineteenth Century', in *Scottish Textile History*, ed. by John Butt (Aberdeen: Aberdeen University Press, 1987), pp. 78–96; Anderson, *Tweed*; E.P. Harrison, *Scottish Estate Tweeds* (Elgin: Johnstons of Elgin, 1995); Janet Rae and Ian Urquhart, *Fabric of Scotland: The Story of Johnstons* (Elgin: Johnstons of Elgin, 2018).
- 4 Regina Lee Blaszczyk, *The Color Revolution* (Cambridge, MA: The MIT Press, 2012), pp. 21–44; Charlotte Nicklas, 'One Essential Thing to Learn is Colour: Harmony, Science and Colour Theory in Mid-Nineteenth-Century Fashion Advice', *Journal of Design History*, 27 (2014), 218–36; Charlotte Nicklas, 'New Words and Fanciful Names: Dyes, Color and Fashion in the Mid-Nineteenth Century', in *Bright Modernity: Color, Commerce and Consumer Culture*, ed. by Regina Lee Blaszczyk and Uwe Spiekermann (Cham, Switzerland: Palgrave MacMillan, 2017), pp. 97–111;

menswear cloths and T. A. Stillie argues that in the latter half of the nineteenth century, Scottish production was ‘almost wholly in gents’ wear, and only a few select companies dealt in ladies wear [...] and this was often through sportswear cloths designed for the gents’ trade’.⁵ Furthermore, Edward S. Harrison’s original account, ‘The Ladies Trade’, confirms that only a small proportion of Scottish mill-woven tweeds were adopted by women before 1919.⁶ Previous research indicates that although tweeds were increasingly popular amongst British middle- and upper-class women from the 1870s, these cloths were still worn predominantly by men. In addition, before 1919, female consumption of tweeds in Britain mainly involved cloths made in Yorkshire, which lie outside the scope of this chapter.⁷ The scant published research on European and American men’s fashion textiles of the nineteenth century has primarily focused on English broadcloths in black, or other dark colours, which were only worn for formal day and evening wear.⁸ Furthermore, the influence of the ideas of the psychologist J. C. Flugel and John Harvey’s *Men in Black* has tended to persist within the literature on colour, fashion and synthetic dyeing in the late nineteenth and early twentieth centuries.⁹ By contrast, this chapter investigates the nuanced use of colour within the Scottish tweeds that were increasingly worn by men within the modern contexts of informal daywear, sport and leisure between 1829 and 1914. It further challenges the lingering acceptance of the Flugellian idea that nineteenth-century textiles for menswear

Alexander Engel, ‘Coloring the World: Marketing German Dyestuffs in the Late Nineteenth and Early Twentieth Centuries’ in *Bright Modernity*, pp. 37–53.

5 Stillie, ‘The Evolution’, pp. 330–31.

6 E.S. Harrison, *Scottish Woollens*, pp. 169–70.

7 *Ibid.*; Lou Taylor, ‘Wool Cloth and Gender: the use of woollen cloth in women’s dress in Britain, 1865–85’ in *Defining Dress: Dress as Object, Meaning and Identity*, ed. by Amy de la Haye and Elizabeth Wilson (Manchester: Manchester University Press, 1999), pp. 30–47 (p. 43); Anderson, *Tweed*, pp. 64–72.

8 Anne Hollander, *Sex and Suits* (New York: Kodansha America Ltd, 1995), pp. 92–3; Laurie Anne Brewer ‘The Material Education of the Dandy’ in *Artist, Rebel, Dandy*, ed. by Kate Irvin and Laurie Anne Brewer (New Haven: Yale University Press, 2013), pp. 105–09. As Dominic Janes argues in this volume, men’s use of bright colours, especially towards the end of the century, came to be associated with ‘aesthetic’ and homosexual tastes.

9 J.C. Flugel, *The Psychology of Clothes* (London: Hogarth Press, 1930), pp. 110–13; John Harvey, *Men in Black* (London: Reaktion Books, 1997); Błaszczyk, *Color Revolution*, p. 84; Nicklas, ‘New Words’, p. 98; Dominique Grisard, ‘Real Men Wear Pink’? A Gender History of Color’, in *Bright Modernity*, pp. 77–96 (p. 80).

exclusively came in 'austere' black, or dark colours that were expressive of singular masculine ideals of middle class sobriety and asceticism.¹⁰

Colour, Design, Fashionable Novelty and Gender in the Scottish Mill-based Tweed Industry 1829–1914

The textile historian Kenneth Ponting argues that design was of pivotal importance to the leading reputation for creating high-quality woollen cloths that Scottish tweed manufacturers had developed by the later nineteenth century. He states:

Several of the manufacturers became well-known names in the trade, maintaining over the years a reputation for quality of manufacture rarely equalled elsewhere. There is no doubt that in all its varied aspects the continual emphasis on design, using the word in its widest sense to include care in the use of raw material, was mainly responsible for this.¹¹

The Scottish tweed trade began to develop into the elite branch of the British wool textile industry in terms of design and quality of manufacture from around 1829. At that time, wool textile producers in Scotland principally used coarse, native wool to make simple blue or grey woollens. The substantial academic interest in the history of tartan has led to the importance of these plain cloths to the Scottish woollen industry being overlooked, apart from by Clifford Gulvin. These basic textiles were either undyed, or coloured with indigo, and the gradual adoption of more sophisticated dyeing techniques was pivotal to the success of the new focus on the novelty trade that developed from 1829 onwards.¹² These early developments towards making the fancy woollens that by the 1830s were called tweeds were prompted by a new fashion for adopting the shepherd's check. This simple, checked pattern derived from shepherd's plaids, which were lengths of cloth made from contrasting light and dark colours of natural, undyed wool. These plaids were commonly adopted by shepherds in the Scottish Borders to protect themselves and young lambs from poor weather. From the late 1820s, the new mode for trousers in the shepherd's check brought this long-

10 Flugel, *The Psychology*, pp. 110–13.

11 Ponting, 'The Scottish Contribution', p. 87.

12 Gulvin, *The Tweedmakers*, pp. 32–71.

established rural product of the Scottish woollen industry into the realm of male urban, fashionable consumption.¹³ By that time, the Romantic movement had swept through Europe, and the literary works of Sir Walter Scott had ‘saturated the British fiction market, outselling all other novels combined’, as Ian Duncan confirms.¹⁴ The tweed manufacturer Adam Cochrane argued in 1864 that Scott indirectly popularised items woven in the shepherd’s check through the significant public impact of his work. His well-known novel *Waverley*, for example, features a ghostly character attired in ‘a grey plaid, such as shepherds wear in the south of Scotland’.¹⁵ The lingering cultural influence of Romantic ideas proved to be pivotal to the development of an approach to design and colouring that became typical of Scottish tweeds. The historical and cultural contexts linked to Romanticism are succinctly captured by Elizabeth Wilson. She states that the

Romantic movement of the late eighteenth century and early nineteenth century was one early response to the advance of science and the ‘dark Satanic mills’ of industrialism. It offered a counter-ideology that spoke against the machine age and yet espoused the intense individualism of the new order. [...] nature began to be idealized just at the time when a new and much more wholly urban society was being created by the industrial revolution.¹⁶

Significantly, this idealisation of nature encouraged the fashionability and significant growth of sporting tourism to Scotland from the early 1830s. Furthermore, it influenced the development of new woollen designs and colourings that were linked to the rural environments in which deer stalking, grouse shooting and salmon fishing were increasingly

13 James Locke, ‘A Few Facts on the Tweed Trade’, *The Border Advertiser*, 18 September 1863, 3; Alexander Craig, ‘Reminiscences of the Tweed Trade (1829–1836) By a Pioneer’, *The Border Advertiser*, 9 December 1874, 2; Hugh Cheape, *Tartan* (Edinburgh: National Museums Scotland, 2006), pp. 7–9.

14 Ian Duncan, *Scott’s Shadow: The Novel in Romantic Edinburgh* (Princeton: Princeton University Press, 2007), Preface, p. xi.

15 Walter Scott, *Waverley* (London: Simpkin and Marshall, 1829 edn), p. 324; Adam Cochrane, ‘Notes on the Scotch Tweed Trade’, *Transactions of the National Association for the Promotion of Social Science* (London: Longman, Roberts and Green, 1864), 792–99 (p. 793).

16 Elizabeth Wilson, *Adorned in Dreams: Fashion and Modernity*, 2nd edn (London: I.B. Tauris, 2003), p. 61.

practised.¹⁷ The intermingling of rural and urban contexts was pivotal to the emergence of the tweed trade, as the woollen merchants who played a key role in its early success were located in London and Edinburgh. James Locke, who had premises in the upmarket London location of 119, Regent Street, was particularly influential in developing the early tweed trade, as confirmed by Alexander Craig in 1875. Craig, who worked for a merchant in Edinburgh, also encouraged the early popularity in the metropolis of these new, fancy wool cloths. These merchants were involved with designing tweeds, and they often interpreted design ideas from male consumers and tailors when placing orders with manufacturers in Scotland.¹⁸ James Locke published his recollections of these early developments in the local newspaper *The Border Advertiser* of 18 September 1863. Following the initial popularity of shepherd's check trousers, continued demand was encouraged by over-dyeing them in shades of blue, green and brown, and by weaving broken checks and larger checks.¹⁹ Furthermore, prompted by the desires of his London gentlemen clients, Locke placed an order with a Scottish Borders manufacturer in the early 1830s for 'tweels' in 'thin granite colours [...] in black and white, brown and white running into lighter and darker mixtures'.²⁰ The term 'mixture' denotes a textile created from dyed wool fibres in a range of shades that are mixed together before they are spun into yarn, which produces appealing colours. These blended yarns were not only produced in Scotland, but they unquestionably became one of the key characteristics of Scottish tweeds. Kenneth Ponting confirms that manufacturers in Scotland created 'mixture colours not known before, heather mixtures, for example', which have an overall purple colour effect.²¹

The business historian Regina Blaszczyk notes that 'in the mid-1850s, French mills introduced lilac and purple textiles tinted with natural dyes', thus confirming that these colours were fashionable in womenswear before William Henry Perkins famously created 'mauveine', the first aniline dye.²² It is notable that nearly two decades earlier a fashion for

17 Alistair Durie, 'Unconscious Benefactors': Grouse-shooting in Scotland, 1780-1914', *The International Journal of the History of Sport*, 15 (1998) 57-73 (pp. 58-59).

18 Craig, 'Reminiscences of the Tweed Trade', p. 2; Alexander Craig, 'The Early Stages of the Tweed Trade', *The Border Advertiser*, 20 October 1875, 2.

19 Locke, 'A Few Facts', p. 3; Cochrane, 'Notes on the Scotch Tweed Trade', p. 793.

20 Locke, 'A Few Facts', p. 3.

21 Ponting, 'The Scottish Contribution', p. 84.

22 Blaszczyk, *Color Revolution*, pp. 21-26.

purple-toned heather mixtures developed initially for use in men's sporting tweeds, as James Locke noted in 1863. He explains how and why the novel and more colourful designs of the later 1830s developed:

When first mixtures were enquired for which should resemble the moors and different shooting grounds, by many gentlemen of the rod and gun, we at this time had nothing of the kind, neither was there any in the market. We [...] wrote to a house in Galashiels [...] but as we anticipated, they replied they had never heard of such a name or article [...] we requested them just to imitate the side of Buckholm Hill which overshadowed them [...] A boy was despatched to fetch home some. [...] Now when a handful of this was "squashed" together it had different shades [...] This proved to be the very thing we wanted and led to the introduction of a variety of colours before unknown. These first obtained the name of *heather mixtures*.²³

This account shows that the notion of making tweeds from shades that were selected to 'resemble' the colours of Scottish country landscapes was completely novel. Notably, an 1838 advertisement confirms that Locke was offering 'Heather and Granite Stone Mixtures for Shooting Jackets' for sale through his establishment in fashionable Regent Street.²⁴ It is significant that the development of these new designs took place at a time when Alistair Durie notes there was a substantial increase in upper-class and upper-middle-class men travelling to Scotland to take part in field sports.²⁵ In his text of 1863, Locke makes further revealing statements about the influence of his gentlemen clientele and the colours of domestically woven cloths from the Scottish Highlands on the characteristics of some early tweeds:

we for the first time introduced a yellow colour never seen before in town, although we remembered to have seen it on a Highland drover. This colour, so hateful in general, has become, when tastefully contrasted with others a very favourite one and we maintain that "Scotchified" patterns did not originate with the makers of Scotch tweeds. It was the Highland glens that gave many of them to the trade. Gentlemen brought the colours up from their shooting boxes, as they could not be produced there in any quantity.²⁶

23 Locke, 'A Few Facts', p. 3.

24 *The Satirist*, 2 September 1838, front cover.

25 Durie, 'Unconscious Benefactors', pp. 58–59.

26 Locke, 'A Few Facts', p. 3.

Locke capitalised on the desires of his customers for the domestically woven woollens they had acquired on Scottish sporting trips. He subsequently had tweed designs influenced by these cloths woven in substantial quantities in Scottish Borders mills.²⁷ These new approaches to incorporating vivid colours from rural environments—including autumnal shades of orange, red and yellow—into fashionable sporting tweeds for menswear are further evidenced by an artefact in the collections of Heriot-Watt University. This very rare pattern book dates from 1836–1837 and was created by the Edinburgh-based designers and drapers, J&A Ogilvie.²⁸ Alexander Craig recalled that James and Archibald Ogilvie ‘took a lead in designing patterns, in fact they were undoubtedly the first designers of their day. Their patterns became well known, and were much sought after by the leading wholesale houses in London’.²⁹ It is notable that textile samples within the J&A Ogilvie volume illustrate and confirm the descriptions by Cochrane, Craig and Locke of the design characteristics of the early tweeds. Significantly, some of the Ogilvie designs demonstrate the initial development of what became the principal features of many tweeds from the mid-nineteenth century onwards. These characteristics include the importance of ‘broken effects of colour, attained either by pattern, or by blends of colour’, as identified by Edward S. Harrison in his 1944 text ‘WHAT IS TWEED?’³⁰ Another key feature was the employment of both bright and subtle shades from Scottish rural environments, as illustrated by swatches in the Ogilvie book, which include small areas of vivid orange within an overall design that is principally black and white (see Figure 6.1). These colour effects were similar to the ‘beautifully mottled’ colourings of stones noted by Craig in 1875. He states:

The most successful colourings for mixtures I myself ever hit upon were taken from waterworn stones I collected from the bed of the river Garry in the pass of Killiecrankie—mostly granites, porphyries and jaspers, which I found to be particularly rich in colourings such as reds, greys, and greens, beautifully mottled, and mixed with other finely contrasted colours.³¹

²⁷ *Ibid.*

²⁸ J. & A. Ogilvie pattern book, Textile Archive, Heriot-Watt University, GH.6.1.1.

²⁹ Craig, ‘The Early Stages of the Tweed Trade’, p. 2.

³⁰ E.S. Harrison, *Scottish Woollens*, p. 150.

³¹ Craig, ‘The Early Stages of the Tweed Trade’, p. 2.



Fig. 6.1. J&A Ogilvie pattern book, 1836–37, tweed samples, Heritage Information and Governance, Heriot-Watt University, G.H. 6.1.1.3, photo by Fiona Anderson.

This approach of incorporating bright colours from nature in limited proportions within an overall design to yield attractive variegated colour effects has proven to be highly influential on tweed design since the 1830s. A key characteristic of these methods is that they provide scope for endless novelty and variety in colour and pattern, whilst maintaining a visually coherent relationship to the broad ‘family’ of tweed. Significantly, the overall appearance of these tweeds designed for menswear was often dark or subdued, with bright shades of yarn only obvious when close up to the wearer. The leading woollen merchant George Harrison & Co. of Edinburgh published a trade circular ‘The Tweed Trade’ on 24 March 1864, which confirms these points:

The patterns for next winter have nearly all been prepared, and exhibit great ingenuity and improving taste on the part of the designers. So far as we are able to judge, dark grounds with small patterns of bright and fancy colourings, will be the style for plain goods, and as the public taste apparently requires something more *recherche* than has appeared

in the market for some seasons, fancy checks in considerable variety will likewise be shown.³²

This emphasis on colour, design and fashionable novelty encouraged the British and international demand for Scottish tweeds, which was 'becoming very great among commission and export houses', as further noted in the Harrison circular.³³ In addition, the influence of Scottish tweed designs was commented on within the Juror's Report on Woollen Goods linked to the London-based International Exhibition of 1862: 'To the Scottish manufacturers belong the credit of [...] having led for a considerable period the public taste. So largely have their productions been imitated on the Continent, that many of the choicest fancy trouserings of France and other countries are easily traceable in design and colouring to their Scotch origin'.³⁴

From the early 1850s, tweeds became increasingly popular for making the newly fashionable lounge suits that were considered socially appropriate attire in the country and as informal morning wear in town. The term 'business suit' that is more familiar today was also used to describe this modern combination of matching jacket, trousers and waistcoat from the early twentieth century, as Christopher Breward notes.³⁵ Significantly, the approach to variegated colour in tweed design that initially developed for the purpose of country sporting camouflage was subsequently adapted for use in urban settings. Examples of tweed suiting cloths for wear in town are contained within a Blenkhorn Richardson & Co. Ltd range book of winter 1907. These samples are essentially dark in colour, but they have silk or wool yarns in vivid tones of orange, yellow, red, green and purple running through them. Notably, these subtle colour effects position these tweeds at the elite, luxury end of the menswear market. Additional, more colourful tweed swatches in this range book confirm that by the early twentieth century, British men still had more freedom to experiment with colour in cloths that were adopted in sporting, country or leisure contexts.³⁶

32 George Harrison & Co., trade circular 'The Tweed Trade', 24 March, 1864.

33 *Ibid.*

34 'Juror's Report on Woollen Goods in the International Exhibition of 1862', in Adam Cochrane, 'Notes on the Scotch Tweed Trade', p. 799.

35 Christopher Breward, *The Hidden Consumer: Masculinities, Fashion and City Life 1860-1914* (Manchester: Manchester University Press, 1999), p. 46.

36 A.1996.279, National Museums Scotland.

Colour, Gender and Dyeing in the Scottish Mill-based Tweed Industry 1856–1914

In an early twentieth-century booklet, *The Manufacture of Scotch Tweeds*, David Christie posited that ‘the popularity of Scotch Tweeds depends upon three things: The sterling value and soundness of the wools and yarns employed; the artistic effects of the blending and arrangement of the colours; and lastly, great care that the dyes should not be of a fugitive nature’.³⁷ Christie argued that these factors were pivotal to maintaining the high-quality standards that distinguished the ‘real Scotch Tweed’ from cheaper imitations of these cloths.³⁸ Notably, he did not mention which types of dyes were commonly used to make these textiles by the early twentieth century. Furthermore, the published literature on the history of tweed does not address the question of when synthetic dyes began to be used to make these cloths in mainland Scottish mills.³⁹ This section therefore focuses initially on investigating the limited published sources that consider the development of synthetic dyeing in the British wool textiles industry. Primary research is then used to explore the extent to which dyeing practices in the Scottish Borders tweed industry were similar to, or diverged from, that broad pattern of development.

In their economic history study *The British Wool Textiles Industry 1770–1914*, David Jenkins and Kenneth Ponting argue that the most important technological advances in that branch of manufacturing between 1870 and 1914 related to dyeing and other chemical processes such as carbonising. Regarding the use of dyes in that industry in the seventy years before the development of synthetic colourants, they confirm that:

Indigo was the most widely used dye, not only for blues but with various yellow dyes for greens, with various reds for purples, and still to some extent for blacks when overdyed with fustic or madder. For blacks, however, more often logwood was used by 1800 [...] Logwood

37 David Christie, *The Manufacture of Scotch Tweeds* (promotional booklet for Peter Anderson Ltd, undated), p. 4.

38 *Ibid.*

39 E.S. Harrison, *Scottish Woollens*; Stillie, ‘The Evolution’, 309–31; Gulvin, *The Tweedmakers*; Ponting, ‘The Scottish Contribution’, pp. 78–96; Anderson, *Tweed*; E.P. Harrison, *Scottish Estate Tweeds*; Rae and Urquhart, *Fabric of Scotland*.

gave an excellent black, when mordanted with iron, and a better one still when chrome mordants were introduced in the middle of the nineteenth century.⁴⁰

Jenkins and Ponting also identify, through their material cultural analysis of pattern books, that 'the main problem facing the earlier dyers was matching one batch to another and this had always been the case with the natural dyes which were not usually standardised'.⁴¹ From the mid-1850s, new technological developments in dyeing began to transform the potential ways of colouring textiles. As has been well-documented, the first aniline dye, mauveine, was created by the English chemist William Henry Perkin in 1856, although it was not available commercially until late 1858.⁴² It was followed by a range of other aniline dyes that could be applied directly to wool, without mordanting or vatting. David Jenkins confirms that the development of synthetic dyes had a significant impact on the European and American wool textile industries by the early twentieth century, as it helped manufacturers to offer consistent shades of colour and also to dye woollens more cheaply.⁴³ Jenkins and Ponting argue, however, that the use of the new aniline dyes was 'limited' at first in the British wool textiles industry due to problems with their fastness.⁴⁴ In 1884, the renowned dyeing expert J. J. Hummel expressed the similar view that it was 'unfortunate [...] that the brilliant series of colouring matters first derived from aniline were so fugitive'.⁴⁵ Regarding further changes in dyeing within the British wool textile industry in the later nineteenth century, Jenkins and Ponting argue that:

the synthesis of madder also by Perkin and by two German chemists, Graebe and Liebermann, meant that this natural dye could be made artificially. This synthesis led to the coming of a wide range of alizarine

40 David Jenkins and Kenneth Ponting, *The British Wool Textile Industry 1770–1914* (Aldershot: Scolar Press, 1987), p. 214.

41 *Ibid.*

42 Anthony S. Travis, *The Rainbow Makers: The Origins of the Synthetic Dyestuffs Industry in Western Europe* (Bethlehem, PA: Lehigh University, 1993), pp. 36–51; Engel, 'Coloring the World', p. 38.

43 David Jenkins, 'The Western Wool Textile Industry in the Nineteenth Century', in *The Cambridge History of Western Textiles, II*, ed. by David Jenkins (Cambridge: Cambridge University Press, 2003), 761–89 (p. 764).

44 Jenkins and Ponting, *The British Wool Textile Industry* p. 215.

45 J.J. Hummel, 'Notes on the Application of Alizarine and Allied Colouring Matters to Wool Dyeing', *Journal of the Society of Dyers and Colourists*, 1 (1884–85), 11–16 (p. 11).

dyes and these provided many valuable additions to the repertoire of the wool textile trade. But, until the end of the century natural dyes to a large extent held their position, indigo for the various purposes already listed and logwood as the best black. Then the last years of the century brought two developments: synthetic indigo was introduced and because of its better standardisation soon replaced the natural product, and a series of chrome blacks were invented which, after quite a struggle, largely replaced logwood.⁴⁶

The long-term impact of these developments was confirmed by the *Yorkshire Observer's Annual Review* of 1915, which stated that manufacturers of heavy woollens had become so dependent on aniline dyes from Germany by 1914 that the 'difficulty of procuring them will be one of the chief obstacles in the way of the woollen trade until the end of the war'.⁴⁷ The term 'heavy woollen' was another name for the mass market cloths made in great volume in Yorkshire from recycled wool. Significantly, Hummel confirmed in 1884 that these cheap woollens required a high degree of 'permanency of colour', which underlines the major improvements made by the early twentieth century in the fastness of synthetic dyes.⁴⁸

Primary research completed for this chapter has explored the extent to which dyeing practices in the Scottish tweed industry aligned with the broad developments identified by Jenkins and Ponting. In 1856, National Museums Scotland (formerly the Industrial Museum of Scotland) acquired an extensive group of dyestuffs used by the leading tweed manufacturer P & R Sanderson of Galashiels, Scottish Borders. The dyes collected were ground logwood, indigo, madder, cudbear, lac, cochineal, camwood or redwood, quercitron, ground fustic and woad.⁴⁹ These natural dyes, with the exception of quercitron bark from America, were long established as being 'typical and common for dyeing wool' in eighteenth-century Europe, as confirmed by Anita Quye, Dominique Cardon and Paul Balfour.⁵⁰ In addition, they align well with Jenkins

46 Jenkins and Ponting, *The British Wool Textile Industry*, p. 215.

47 *Yorkshire Observer's Annual Review*, 1915, text reproduced in *The Economist*, 19 February 1916, 69.

48 Hummel, 'Notes on the Application of Alizarine', p. 11; Engel, 'Coloring the World', p. 43.

49 T.1856.80.B.2-21, National Museums Scotland.

50 Anita Quye, Dominique Cardon and Paul Balfour, 'The Crutchley Archive: Red Colours on Wool Fabrics from Master Dyers, London, 1716–1744', *Textile History*, 51

and Ponting's description of typical British dyeing practices for wool before the availability of synthetic colourants.⁵¹ A trade circular from the merchant George Harrison & Co. of 5 October 1864 features revealing evidence about changing dyeing practices in the tweed industry:

Full advantage has been taken by Tweed manufacturers of the recently-discovered "tar colours," and since they were first introduced a manifest improvement in designs is observable. The brightness of aniline shades, not less than their expensiveness, appeared at first likely to render them unsuitable for modern ideas of gentlemen's dress; but the skill with which they are combined and blended with graver shades, both in wool mixtures and yarns, and the facilities which are afforded by so great a variety of them in forming harmonious amalgamations or bold contrasts, have been of immense service to the trade. The test of several seasons has proved their excellence as durable colours when properly dyed.⁵²

Notably, this text confirms that these cloths were almost exclusively designed for men during this period. By addressing elite wool textiles for menswear, it extends the conclusions of Alexander Engel, who argues that, when it came to silk fabrics for womenswear, 'the aniline dyes of the late 1850s and the 1860s were extremely costly and usually employed in the dyeing of luxury silks, for which new fashionable colors and startling shades were worth almost any price'.⁵³ It is notable that the Harrison circular refers to the brief era when the first aniline dyes became commercially available, and when the luxurious prestige, novelty and modernity of these colourants might have been perceived by George Harrison as excellent selling points for the high-class tweeds he sold. The high cost of utilising these brilliant dyes in the early 1860s would have been mitigated to some extent by their use in small amounts within an overall tweed design. The detailed trade knowledge demonstrated by George Harrison & Co. in their 1864 circular indicates that the assertion that aniline dyes were used by many Scottish tweed manufacturers is worthy of further investigation. Exploring further comment from George Harrison & Co. through other circulars has not been possible, as these documents either did not exist or have not

(2020), 119–66 (p. 15).

51 Jenkins and Ponting, *The British Wool Textile Industry*, p. 214.

52 George Harrison & Co., trade circular 'The Tweed Trade', 5 October 1864.

53 Engel, 'Coloring the World', p. 39.

survived. Comparison of the October 1864 circular with a wider range of research evidence, including a British government report of 1872, local newspapers and a previously unpublished dye book has, however, yielded a more nuanced historical picture.

Major concerns about river pollution in Victorian Britain prompted a series of government reports, which contain detailed information about dyeing practices in the wool textile producing districts of England and Scotland. The fourth report commissioned in 1868, and published in 1872, incorporates findings from the Scottish Borders region, including responses from thirty-eight woollen manufacturers, two specialist dyers and one woollen yarn spinner to standard questions about the use and disposal of dyes and other waste. Significantly, only three of these forty-one companies declared that they used aniline dyes, namely the tweed manufacturers George Lees and Company of Galashiels, George Roberts & Company of Selkirk and William Watson & Sons of Hawick.⁵⁴ The latter firm did not quantify the proportions of different dyes used, simply stating that ‘we use as dye wares, chiefly logwood, aniline dyes and cochineal 52 tons yearly’.⁵⁵ By contrast, the first two mills reported that they predominantly used natural dyes, along with some synthetic colourants. George Roberts & Company of Selkirk, for example, stated that they ‘use annually as dye wares, logwood and other vegetable dyes, 99,800 lbs [...] aniline dyes, 660 [...] cochineal 207’.⁵⁶ Artificial colourants would have featured in a greater number of tweeds than simply indicated by these proportions, because bright colours were typically only used in limited amounts within each design. Nevertheless, it is clear that the use of aniline dyes in the Scottish Borders tweed industry was very limited between 1868 and 1872.

The government report of 1872 contains the transcripts of oral witness interviews with the owners of several Scottish Borders tweed mills. Mr Robert Gill of Walker, Gill and Company, Innerleithen who was interviewed on 16 September 1870 responded to the question ‘are you interested at all in aniline colours?’, by stating ‘yes, but they are less dyed here now than they were some time ago, but still

54 Royal Commission on Rivers Pollution Prevention of 1868 (Rivers Pollution Commission of 1868), *Fourth Report* (Scottish Rivers), C.603, 1872, II, 123–37.

55 Rivers Pollution Commission of 1868, *Fourth Report*, II, 131.

56 *Ibid.*

those colours are dyed'.⁵⁷ Significantly, this oral evidence clarifies the apparent contradiction between the findings of the 1872 report about the limited use of aniline dyes, and the marked enthusiasm amongst tweed manufacturers for using synthetic dyes in the early 1860s noted by George Harrison & Co. in 1864. Together, the evidence from Harrison & Co., Mr Robert Gill and the wider 1872 report suggests that while initial interest in experimenting with aniline dyes had waned by 1870, these dyes were still being used by a few tweed producers in that era.⁵⁸

The prompt decline and limited continued use of the early aniline dyes in the tweed industry may be explained with reference to late nineteenth-century texts on dyeing, including Hummel's statement in 1884 that these dyes were 'so fugitive'.⁵⁹ Furthermore, as J. W. Slater noted in his dictionary of dyestuffs of 1870, 'the degree of permanence required varies very much according to the nature of the goods and the circumstances to which they are likely to be exposed. Articles of dress which will only be worn once or twice, and that by artificial light, may be dyed with colours of a very fugitive class'.⁶⁰ A fashionable silk ballgown is a typical example of clothing worn in that type of environment around 1870. By contrast, from the 1850s, Scottish tweeds became increasingly widely worn by upper- and upper-middle-class British men for informal morning wear in town, as well as for country sporting attire worn outside in all types of weather.⁶¹ Appropriate dyeing materials for luxury silks for womenswear therefore diverged significantly from those suitable for fashionable tweeds for menswear, because the latter required a higher degree of fastness, particularly if worn in sporting contexts. In 1885, William Perkin noted in his presidential address to the Society of Chemical Industry that although the first aniline dye he developed was the fastest purple shade on the market at that time, 'the love of brilliancy of colour which it has induced caused less attention

57 Rivers Pollution Commission of 1868, *Fourth Report*, III, 189.

58 George Harrison & Co., 'The Tweed Trade', 5 October 1864; Rivers Pollution Commission of 1868, *Fourth Report*, II, 123–37 and III, 189.

59 Hummel, 'Notes on the Application of Alizarine', p. 11.

60 J.W. Slater, *The Manual of Colours and Dyewares. Their Properties, Applications, Valuation, Impurities and Sophistications. For the Use of Dyers, Printers, Drysalts, Brokers etc.* (London: Lockwood & Co., 1870), pp. 50–51.

61 Anderson, *Tweed*, pp. 49–57.

to be given to the subject of fastness'.⁶² E. Schunk made similar points about fashion and dye selection in a lecture of 1888, stating that 'it is of little consequence, as Chevreul observes, whether the colour of ladies' dresses is permanent or not, since here it is only brilliancy and lustre that are sought'.⁶³ In 1884, Hummel noted the positive impact that this fashionable demand had on technological progress by 'keeping alive the manufacture of even fugitive colouring matters and thus stimulating that particular field of chemical research which has at length yielded colouring matters of greater permanency'.⁶⁴ The interconnections between the environments clothes were worn in, cost, dye fastness, fashion and the gendering of textiles were shifting and highly complex in the late nineteenth century. An example of the nuanced specificities involved was given by James Locke in 1860, who advised that when fishing, 'the drab colour is the best of standing the sun's rays, as heather mixtures soon lose their colours in summer'.⁶⁵ The continued popularity of the heather mixture design despite its limited fastness at that time confirms that tweed manufacturers had to strike an appropriate balance between fashionable novelty and dye permanence. The seasonal imperative to create new and appealing tweeds, as discussed earlier, is a key factor in explaining why, by 1870, George Lees and Company, George Roberts & Company, and William Watson & Sons continued to use limited amounts of the early aniline dyes.

Surviving evidence about tweed dyeing practices between 1873 and 1909 is limited, which is not surprising: firms regarded these matters with some secrecy because colour and design were pivotal factors in their competitiveness. Local Scottish Borders newspapers, however, provide some useful indications that alizarin dyes were becoming more widely used by the period of 1888 to 1891. An advertisement in the *Hawick Express* of 12 May 1888 confirms that the large tweed mill Blenkhorn, Richardson & Co. wished to recruit a Foreman Dyer

62 William Henry Perkin, 'The President's Address', *Journal of the Society of Chemical Industry*, 4 (1885), 427–38 (p. 428).

63 E. Schunk, 'Some Remarks on the Theory of Dyeing', *Journal of the Society of Chemical Industry*, 7 (1888), 815–19 (p. 819).

64 Hummel, 'Notes on the Application of Alizarine', p. 11.

65 James Locke, *Tweed and Don; or, Recollections and reflections of an angler for the last fifty years* (London: Simpkin, Marshall and Co., 1860), p. 19.

with a 'good knowledge of the Alizarine process'.⁶⁶ Furthermore, James Dalziel & Co., a Walkerburn tweed producer, advertised in the *Scottish Border Record* of 15 June 1889 for an experienced dyer 'accustomed to Alizarine dyeing', and a similar advertisement from another manufacturer was published on 27 March 1891.⁶⁷ An article on the tweed trade in the *Hawick News and Border Chronicle* of 26 December 1890 explains why these artificial colourants were becoming more widely used:

Blues, smokes, and slates, which have been the leading colours are now giving place to mouse browns, blue-browns and red-browns. With the new alizarine dyes, browns of almost every shade can now be got much faster in colour than the old, ordinary browns, which used to fade rapidly, so that the public will now have more satisfaction.⁶⁸

These comments are supported by research undertaken by Hummel in 1884 on the light fastness of alizarin dyes when applied to wool, which was a novel technique at that time.⁶⁹ Further evidence that suggests synthetic dyes had become more widely used in the tweed industry around 1900 comes from an article in *The Scotsman* newspaper of 1 December 1905. This article reported on a court action taken by 'Fritz Gans and others, manufacturers of aniline colours [...] Germany, against Kemp, Blair & Co. (Limited) Gala Dye Works, Galashiels'—one of the three specialist dyers in that prominent centre of the Scottish tweed industry. The article notes that these two firms had done business since at least 1901, which is unsurprising given the dominance of Germany in the global market for synthetic dyes by that era, as confirmed by Engel.⁷⁰

An extremely rare dye book held by Heriot-Watt University contains substantial evidence of the extensive use of synthetic dyes by a range of Scottish Borders tweed manufacturers by around 1910. The

66 Advertisement, *Hawick Express*, 12 May 1888.

67 Advertisements, *Scottish Border Record*, 15 June 1889 and 27 March 1891.

68 *Hawick News and Border Chronicle*, 26 December 1890, 3.

69 J.J. Hummel, 'Alizarine in Wool Dyeing', *Journal of the Society of Chemical Industry*, 3 (1884), 594–601 (p. 596).

70 *Scotsman*, 'FRITZ GANS AND OTHERS V. KEMP, BLAIR & CO. (LIMITED) AND OTHERS', 1 December 1905; Engel, 'Coloring the World', p. 37.

original firm that created this volume is not named within it, nor is it identified in the associated archival records. Clues within this book, however, indicate that it belonged to a specialist dyer who did orders for seventeen tweed manufacturers, including George Lees & Co.; Adam L. Cochrane; Sime, Sanderson & Co.; Brown Brothers; Clarke Brothers; and Henry Ballantyne & Sons.⁷¹ Companies that provided dyeing and finishing services to Scottish Borders mills were established during the late nineteenth century, although Gulvin notes that ‘most firms retained control over these processes’.⁷² The book in question contains 220 dyed yarn samples that each correspond to a specific dye recipe, customer name, colour name or number and weight of yarn to be dyed. These wool samples come in a substantial variety of subtly differentiated shades of blue, black, purple, grey, green, brown, red, orange and yellow, and there are only four samples in the glaringly bright colours that are commonly associated with synthetic dyes (see Figure 6.2). Significantly, logwood is only used in three of the samples. By contrast, the other natural dye listed, fustic extract, is employed in 75 of the 220 dye recipes, which results in many different named colours including drab, gold, red brown, amber, chestnut, dark grey, slate, olive and sage. The colourings in this dye book show a clear relationship to fashionable novelty and the design inspiration from rural landscapes discussed earlier in this chapter. A minority of the dye samples are highly textured *fantaisie* yarns for womenswear, which is consistent with Edward S. Harrison’s account that only a small proportion of Scottish mill-woven tweeds were adopted by women before 1919.⁷³ The increasing male adoption of the tweed lounge suit within a wider range of social contexts by 1910, including for urban attire, is reflected in the varied range of dyed shades of black, grey, brown and dark blue, which would typically have been accompanied by other coloured yarns to make a variegated design.⁷⁴

71 Dye book, c.1910, TEPH 8-1, Heriot-Watt University Archive. The date of 14 January 1910 is hand-written inside the front cover.

72 Gulvin, *The Tweedmakers*, p. 155.

73 E.S. Harrison, *Scottish Woollens*, pp. 169–70.

74 Anderson, *Tweed*, p. 52.



Fig. 6.2. Dyed samples, dye book, Scottish Borders, c.1910, Heritage Information and Governance, Heriot-Watt University, TEPH 8-1, photo by Fiona Anderson.

Engel's research on artificial dyes has confirmed that, while 'before 1870, fewer than fifty dyes were known in the market; by 1913, there were around 1,300—marketed in close to 9,000 major varieties'.⁷⁵ This immense variety of available synthetic colourants has informed the large range used within the Heriot-Watt dye recipe book dating from around 1910. In addition to alizarin and acid dyes in many colours, 'Congo Orange', 'Diamine Fast Red', 'Hessian Purple', 'Anthraquinone blue', 'Sulfron Cyanine GR' and 'Delta Purpurine' are just some of the dyes listed. The fact that this dye book contains orders from seventeen Scottish Borders tweed manufacturers strongly indicates that synthetic dyes were well

⁷⁵ Engel, 'Coloring the World', p. 43.

established in that industry by around 1910. By that time, there were many reasons to predominantly use artificial colourants, including their relative cheapness and the greater consistency of shades they offered compared to natural dyes. Other significant factors included the wide variety of colours available to extend the visual repertoire of an industry known for colour and design. Finally, the significant improvements in the degree of fastness offered by synthetic dyes supported the aim of tweed manufacturers to offer cloths of the highest quality standards.⁷⁶

Conclusion

Through the example of Scottish mill-woven tweeds, this chapter has examined the complex relationships between colour, design, new dyeing technologies, masculinities and fashion between 1829 and 1914. It has shown that sweeping Flugellian characterisations of nineteenth-century textiles for menswear as exclusively black or dark overlook significant, nuanced historical detail.⁷⁷ This chapter does not contest the important research by Charlotte Nicklas and others that has identified the 'central importance of consumer demand, especially that by women, as a spur to dye development'.⁷⁸ Instead, it extends the notion that 'color was the great enabler that permitted many industries to generate endless novelty' by showing the significance of these ideas to wool fashion textiles designed for men in the modern era.⁷⁹ Exploring the use of colour in early tweed design has revealed the powerful influences of Romanticism, rural landscapes, sport, fashion and masculinities on the design evolution of these cloths. The modern activities and sometimes challenging climatic environments related to the wearing of tweeds in this period meant that fastness was of considerable importance, which discouraged the extensive use of synthetic dyes in the Scottish tweed industry until the early twentieth century. Factors that encouraged the substantial use of synthetic dyes by that time included significant improvements in their colour permanency, greater standardisation,

76 Christie, *The Manufacture of Scotch Tweeds*, p. 4; Jenkins, 'The Western Wool Textile Industry', p. 764.

77 Flugel, *The Psychology of Clothes*, pp. 110–13; John Harvey, *Men in Black*.

78 Travis, *The Rainbow Makers*, p. 37–56; Blaszczyk, *Color Revolution*, p. 27; Nicklas, 'New Words', p. 97.

79 Nicklas, 'New Words', p. 99.

reduced costs and the ongoing need for manufacturers to remain competitive by creating appealing and novel colouring effects.⁸⁰

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80 Jenkins, 'The Western Wool Textile Industry', p. 764.

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7. The Queerly Racialised Colours of Religion and Decadence at the Universities of Oxford and Cambridge

Dominic Janes

The Sexual Offences Act (1967) was intended to legalise male homosexual sexual acts in England but only when they were carried out in private. It was not expected that ostentatious displays of same-sex affection would suddenly become commonplace. Before this date, homosexuality was associated with the behaviour of what were widely seen as sexual deviants. It was supposed that many such men were androgynous and would, if given the chance, dress in colourfully 'effeminate' styles. These attitudes directly descended from debates in the nineteenth century over the connections between colour and the conceptually linked material realms of bodies and their clothing. Racialised understandings of colour as related to skin tones included assumptions that allegedly primitive peoples were variously sexually animalistic, effete or perverse. The normative British male body could be understood as colourless in so far as it was conceptualised as white, but its adornment with bright clothing increasingly required the masculine alibis provided by military or sports uniforms. Strong colours could be justified as possessing the utilitarian purpose of visibility on the battlefield or at team events. Subtle and exotic hues, by contrast, particularly mixtures such as blue-green or shimmering iridescences, fell under suspicion of being the bearers of recondite meanings that implied peculiar and unhealthy fascinations.

This chapter explores the evolution of these stereotypes by focusing on a case study of images of so-called 'aesthetic' students at the universities of Oxford and Cambridge. These were individuals who, it was alleged, looked to the stylistic and sexual example of Oscar Wilde. To be colourful, particularly to be a man who dressed colourfully, was to court attention. All of this helps to explain the apparently histrionic response of newspaper writers to the appearance on Wilde's person of a green-dyed carnation in 1892. The floral buttonhole betrayed its artificial origins since the result was not a true green but a strangely metallic, blue-green colour. Innocuous aniline dyes or inks would have been used, but artificial green retained a frisson from the poisonous arsenic that had been used to make this colour earlier in the century. Because the perversity of Wilde's material adornments were understood as a reflection of his bodily desires, such floral practices could be seen as against nature in a way that evidenced a decadent taste for sickly or even decaying green-tinged flesh.¹ This placed a discomfiting focus on contemporary tensions between admiration for mother nature and the masculine realm of scientific progress (including research into chemical dyes) which many hoped would save the 'race' from degeneration.

All this did not go unnoticed on campus. Student periodicals participated in either aesthetic expression or parody of it before and after Wilde's trials of 1895. Of particular importance were Oxford's *The Isis* (founded 1892) and *The 'Varsity: A Social Review of Oxford Life* (founded 1901), and Cambridge's *The Granta* (founded 1889). These publications contained commentary that varied from the serious to the ludic, but even the lighter aspects of such satire can be understood to have participated in overt student debate over gender and culture, as well as in more covert interventions over sexuality.² The journals were originally illustrated with photographs and drawings in black and white, although elements of colour were introduced during the interwar years as this became more cost-effective.

1 Stefano Evangelista and Charlotte Ribeyrol, 'Colour for Colour's Sake', in *Colour Revolution: Victorian Art, Fashion and Design*, ed. by Charlotte Ribeyrol, Matthew Winterbottom and Madeline Hewitson (Oxford: Ashmolean Museum, 2024), pp. 173–91 (pp. 185–86).

2 For a comparison with parody at the national level, see Dominic Janes, *Oscar Wilde Prefigured: Queer Fashioning and British Caricature, 1750–1900* (Chicago: University of Chicago Press, 2016), pp. 171–226.

I will start this chapter by exploring intersectional aspects of debates over the use of colour in costume. The discovery of melanin in 1873 ushered in a more chemical understanding of skin colour, and led to a more colourist—as opposed to a cultural—view of racial difference.³ It will be seen that race, thus interpreted through skin tone, played a role complementary to sartorial choices in the way in which the visual appearance of ‘exotic’ male students was commented on and satirised. The categories of those who were seen as colourful characters—queer, at the minimum, in the sense of ‘strange’—overlapped with those who were classed as men of colour because they were racially non-white. Furthermore, such people were frequently alleged to be insufficiently manly. I then explore the impact of Wilde, first as a student and later as the subject of public scandal, on attitudes to aestheticism and decadence in these two universities. Finally, I will argue that the by then more obviously homosexualised queer styles of the *fin-de-siècle* were available for creative appropriation by a new generation of students in the Edwardian and interwar periods. Queer men, alongside non-whites, were exoticised in a student culture that seems to have been alternately fascinated by and fearful of diversity.

Men, Colour, and Men of Colour

Women were first able to attend Cambridge in 1869 and Oxford from 1878, but they were not able to take university degrees at this date.⁴ They also remained a small minority of the student body. Student publications were, not surprisingly, primarily written by men for men, and what we would term male gender norms—for example, in matters of costume—were a frequent preoccupation. Looking back on the sartorial traditions of the long nineteenth century, the psychologist J. C. Flugel wrote in his *The Psychology of Clothes* (1930) that men had renounced the use of bright colours.⁵ He related this to the demise of aristocratic flamboyance at the time of the French Revolution and the restriction of colourfulness to

3 Madeline Hewitson, ‘Surface Matters: Skin Colour, Race and Materiality’, in *Colour Revolution*, pp. 123–30 (p. 123).

4 Dyhouse, Carol, *No Distinction of Sex? Women in British Universities, 1870–1939* (London: UCL Press, 1995), pp. 14–27, 54–63.

5 J.C. Flugel, *The Psychology of Clothes* (London: Hogarth Press, 1930).

those deemed outside the sphere of Western public politics (i.e. women, children and 'coloured people'). Men, sporting the new middle-class uniform of the black frock coat, were now to be seen in public as sober if not necessarily sombre.⁶ Those who adopted bright colours or overly precise tailoring were liable to be denounced as dandies and accused of 'effeminacy' (i.e. a lack of manliness). There is clear evidence in the student publications of a distaste for men who made too vivid a visual impression. The first in a series of articles on 'undesirable dons' (i.e. academics) in 1905 focused on the figure of the intellectual 'poseur'.⁷ The author later summed up his set of pen portraits, saying that 'all the dons of whom I have written this Term have had "colour," to use the slang of the modern literary man. That is to say, they have stained University life in some way'.⁸

The development of new standards of male normativity has been explained by Paul Deslandes in his important study *Oxbridge Men: British Masculinity and the Undergraduate Experience, 1850–1920* (2005).⁹ Aristocratic privilege declined through the long nineteenth century and was partially displaced by the rise of an essentially middle-class ethos that valorised work (on and off the playing field), Anglican Protestant morality and gender conformity. This took place in association with a cultural reaction against rising diversity in the student population. These two universities were slow to internationalise and it is no accident that the establishment of the Rhodes Scholarships in 1902 faced considerable opposition. We might assume that the scruples were mainly in relation to the moral status of Cecil Rhodes as an imperialist, but student opposition at the time focused more on fears of cosmopolitanism.¹⁰ Although there were some African and Caribbean Rhodes Scholarship constituencies, in reality the vast majority of Rhodes Scholars were

6 John Harvey, *Men in Black* (London: Reaktion, 1995).

7 'Portalone', 'Undesirable Dons. I. The Poseur', *Varsity*, 26 January 1905, 548.

8 'Portalone', 'Undesirable Dons. V. Doesn't Care "a-Fortieth Part of a Rupee"', *Varsity*, 23 February 1905, 618.

9 Paul R. Deslandes, *Oxbridge Men: British Masculinity and the Undergraduate Experience, 1850–1920* (Bloomington: Indiana University Press, 2005), pp. 209–28, is an edited and condensed version of Deslandes, "'The Foreign Element": Newcomers and the Rhetoric of Race, Nation, and Empire in "Oxbridge" Undergraduate Culture, 1850–1920', *Journal of British Studies*, 37.1 (1988), 54–90.

10 Editorial, 'The Rhodesians', *Varsity*, 20 May 1902, 543.

white: the first Indian Scholarships, for example, were not awarded until 1947. However, rising numbers of—often South Asian—students did arrive through various other means such that, by 1920, a significant minority of those matriculating (i.e. entering) Oxford were non-British.¹¹

The claims of women and people of colour were equated in student parody, for example in a drawing of the supposed coat of 'Arms of the Fabian Society' (1907).¹² This socialist group, founded in 1884, was alleged in this drawing to champion the rights of women suffragists and Black people (both of whom were drawn looking ugly and ridiculous). Such women corresponded to the first of two misogynist stereotypes that were popular with (some) male students: first, the woman who, by adopting what were alleged to be the male characteristics of intellectual activity and public engagement, was seen as unfeminine and, therefore, unattractive; second, the pretty, young female student who was essentially eye-candy for men. Women were believed at the time—in a line of thinking that went back to classical antiquity—to be particularly susceptible to colour, and this might explain why they were sometimes associated with colourful men and people of colour.¹³

It has taken a long time for the roles that women played in the development of aestheticism and decadence to be fully appreciated, partly because they were often not taken seriously at the time. An example of this was 'The New Aesthete-Athlete Era' (1881), a cartoon published in the national periodical *Funny Folks*.¹⁴ This showed a boatload of ugly and debilitated women attempting to row whose colourful appearance was implied, in this black-and-white cartoon, by the peacock design of their boat and sunflowers on their outrageously aesthetic frocks. It thereby mocked female sporting abilities and any supposedly 'rational' quality to aesthetic dress, and deployed a gibe—also used against men—that the adepts of beauty were themselves ugly degenerates. The similar tone of the male-centric student media can be

11 Deslandes, "'The Foreign Element'", p. 60.

12 'The Arms of the Fabian Society', *Granta*, 23 February 1907, 213.

13 Lynda Nead, *Victorian Babylon: People, Streets and Images in Nineteenth-Century London* (New Haven: Yale University Press, 2000), p. 188.

14 'The New Aesthete-Athlete Era', *Funny Folks*, 6 April 1881, 116; Dominic Janes, *British Dandies: Engendering Scandal and Fashioning a Nation* (Oxford: Bodleian Library Publishing, 2022), p. 87.

seen from the masthead that accompanied *'Varsity's* 'At the Theatre' column: a Black chorus girl in petticoats.¹⁵

Colour in a racial sense was, however, mocked in a casual rather than an obsessive manner, since the latter was seen as being ungentlemanly. The tone can be judged from moments such as that in the 'comic' novel of university life, *Red Paint at Oxford* (1904), when, 'toward the end [of the meal] Freddy expressed a violent antipathy to the colour of the Turkish gentleman who served us with coffee'.¹⁶ The polite Englishman was not meant to draw attention to such things but could be excused when, as here, he was tipsy and young. In line with this ethos, blacking-up at costume parties was often seen as nothing more than an amusing joke, if a slightly vulgar one. It was a common conceit that Black people were stupid in a way that was similar to white people's prehistoric ancestors.¹⁷ Indians were more visible than Blacks in university life and harder to typecast. It was even possible for an admittedly small student debating society (The Dabblers, Trinity College, Cambridge) to at least consider, if not pass, a motion that 'the Asiatic races are superior to the Teutons' (though a few years later they also almost passed the motion that 'race hatred is a blessing in disguise').¹⁸

James Peiris, who came on a scholarship from Sri Lanka (then Ceylon), became the first non-white President of the Cambridge Union (the university's premier debating society) in 1882, and there was not to be another for many decades.¹⁹ The exceptionally racist language of 'Jehu Pryde's article, 'The Black Peril', which was published in *Granta* in 1901, was, in fact, directed at Indian students who had—prejudice notwithstanding—become increasingly prominent at the Union. In a grotesque precursor of Enoch Powell's racist invective from 1968, 'Pryde' predicted 'ensuing streams of blood' if nothing was done, and provided 'diagrams representing the growth of melanthropy' [i.e. Blackness] in

15 'At the Theatre', *'Varsity*, 22 January 1901, 13.

16 'Pish' and 'Tush', *Red Paint at Oxford: Sketches* (London: Greening, 1904), p. 9.

17 'Og', 'Prehistoric Light Fours', *Granta*, 1 December 1900, 121.

18 Debate undated but signed 7 May 1906 (lost by 3 to 6), Dabblers Society Minute Book 1904–07, Rec 4.4, and debate 23 January 1913 (lost by 4 to 5), Dabblers Society Minute Book 1912–14, Rec 4.7, quoted courtesy of the Master and Fellows of Trinity College, Cambridge.

19 Stephen Parkinson, *Arena of Ambition: A History of the Cambridge Union* (London: Icon Books, 2009), p. 18.

Union audiences over twenty years.²⁰ Not only this, but Hindu rituals were, supposedly, taking place at the Union. A parodic response to this allegation, 'Man Æsthetic', transformed Pryde's religious rituals into an aesthetic festival of 'nature made unnatural [...] where the chanting priests, tie-vestured in the least hint of heliotrope, hair-curled, hymn Venus, Flora, Minerva, or any seeming deity who graces the pantheon of modern paganism'.²¹ This seemingly bizarre vision is a reference to the 'new paganism' which, for example, had been advocated at an Oxford essay-reading society in 1892.²² William Frederick Lofthouse (Trinity College), who was to become a prominent Methodist scholar and educationalist, had criticised the arguments presented and suggested that 'the reader's views of life might have been influenced by the aesthetic surroundings of university life'.²³

In so far as school and university debating was modelled on the proceedings of the Westminster Parliament, and was treated by some students as training for a career in politics, debating societies were, as Dyhouse put it, 'quintessentially arenas of masculine performance'.²⁴ This was precisely why speakers had to be careful to present themselves in line with gender norms. There was a theatrical and performative element to the giving of speeches that laid florid exponents open to charges of effeminacy. Indian students (for whom English was not their first language) were sometimes stereotyped as speaking in prolix circumlocutions and could allegedly become overly emotional (which was seen as a feminine trait) when discussing topics such as imperial affairs.²⁵

'Pryde's' prejudices were called out by the president of the Indian student society, The Majlis.²⁶ There is also evidence of East Asian

20 Jehu Pryde, 'The Black Peril', *Granta*, 4 February 1901, 174–75 (p. 175).

21 H.L.H., 'Man Æsthetic', *Granta*, 16 November 1901, 92–93 (p. 93).

22 Dennis Denisoff, *Decadent Ecology in British Literature and Art, 1860–1910: Decay, Desire, and the Pagan Revival* (Cambridge: Cambridge University Press, 2021), p. 23.

23 A.J. Hughes (Queen's College), 'Christianity and Paganism', 22 November 1892; St Hilary Essay Society Minute Book, 1892–1894, Cup.23, reproduced courtesy of Mansfield College, Oxford. Mansfield was a college for nonconformist students that was closely associated with, but not formally a part of, Oxford University at this date.

24 Dyhouse, *No Distinction of Sex?*, p. 206.

25 Shompa Lahiri, *Indians in Britain: Anglo-Indian Encounters, Race and Identity, 1880–1930*, *The Colonial Legacy in Britain 1* (London: Routledge, 2000), pp. 93–94, 160.

26 'Correspondence. The Black Peril', *Granta*, 9 February 1901, 201–02.

students answering back against colourist attitudes, saying, for instance, that Chinese people did not think of themselves as yellow but as being 'man-colour'.²⁷ Indeed, whiteness was itself something of a state of mind, considering that 'white' skin was actually various shades of brown and pink. Some white students, indeed, rejected such racism, particularly those who took a critical view of the British Empire.²⁸ Academics who attempted to curry favour with their students by sharing racist jokes about coloured students could also be mocked, as in the pen portrait of 'Dons I Dislike... the Humorous Dog' (1912).²⁹ This notwithstanding, it is not surprising that non-white students, particularly those of African heritage, found these universities challenging places to live and study in.³⁰ Both Oxford and Cambridge had the aforementioned Majlis, as well as many other societies where whites and non-whites were (theoretically) able to mix on equal terms.³¹ One example of these were sports clubs where the desire to win might overcome racial prejudice. In 1911, *Varsity* published an editorial on 'playing games' which took the form of a mock defence of a 'native prince [...] of some semi-barbaric state' who saw no point in sport.³² This stereotype was, however, countered by the presence of non-whites who excelled on the river or on the pitch. Since muscularity was seen as inherently masculine, this had the additional benefit of countering those racist assumptions that Asian men, in particular, were lacking in manliness.³³

Men of colour and all-round colourful characters were not only allowed to stand out from the rest if they were sufficiently good at sport, but were expected to do so. Top athletes were elected as 'blues' and were entitled to wear distinctive dark (Oxford) or light (Cambridge) blue blazers and associated regalia. These originated from choices

27 Editorial, 'Thoughts that Occur. The Chin of To-Morrow', *Varsity*, 9 November 1911, 45–6 (p. 45).

28 Richard Symonds, *Oxford and Empire: The Last Lost Cause?* (Oxford: Oxford University Press, 1991), pp. 80–98.

29 'Alceste', 'Dons I Dislike. V. The Humorous Dog', *Varsity*, 22 February 1912, 177.

30 Symonds, *Oxford and Empire*, p. 267.

31 *Ibid.*, p. 262.

32 Editorial, 'Thoughts that Occur. On Playing Games', *Varsity*, 11 May 1911, 256.

33 Symonds, *Oxford and Empire*, p. 263; Mrinalini Sinha, *Colonial Masculinity: The 'Manly Englishman' and the 'Effeminate Bengali' in the Late Nineteenth Century* (Manchester: Manchester University Press, 1995); 'Ranji', *Granta*, 17 October 1896, 3–4.

made by the respective university rowing teams in the 1820s and 1830s which may, in turn, have derived from the colours associated with the public schools Harrow and Eton.³⁴ Over time, the university's elite cadre of blues became associated with the defence of what were seen as traditional political values and gender norms.

As the two universities expanded, there was an explosion in the number of clubs and societies which differentiated themselves from one another by the elaboration of uniforms for both sporting events and social occasions. The aim of such outfits, like traditional military uniforms, and in imitation of professional athletes, was to provide immediate visibility; and the result was a profusion, and sometimes a confusion, of bright colours.³⁵ The male renunciation of colour clearly had a major exception when it came to masculinised group identities, whether military or sporting. But men still had to be careful not to extend their tastes for brightness to their private attire, as shown in a squib, 'The 'Varsity "Blood"' (1909), which denounced this character's 'lurid tie' and 'socks [that] are green, and pink, and red'.³⁶ In contrast to the aforementioned effeminate priests with their ties of the subtlest heliotrope, the masculine dandyism of some public school (pure) 'bloods'—who sometimes were, or aspired to be, blues—was parodied for its swaggeringly indiscriminate use of colour.³⁷ In the case of his socks, this particular blood was in danger of sending the wrong sexual signals, since Havelock Ellis in *Sexual Inversion* (1915, first edition 1897) claimed that homosexuals ('inverts') had unusual preferences for green and red.³⁸ Interestingly, Ellis also racialised such tastes, since he claimed that green 'is very rarely the favourite colour of adults of the Anglo-Saxon race'.³⁹

34 Christopher Thorne, 'Blues and the Blues Committee: Some Historical Notes', 10 July 1996, <https://www.yumpu.com/en/document/view/9497798/blues-and-the-blues-committee-cambridge-university-sport>.

35 Dave Day and Samantha-Jayne Oldfield, 'Delineating Professional and Amateur Athletic Bodies in Victorian England', *Sport in History*, 35.1 (2015) 19–45.

36 'Jawjar', 'The 'Varsity "Blood"', *Granta*, 20 November 1909, 110.

37 J.A. Mangan, 'Blues, Bloods and Barbarians: Some Aspects of Late Victorian Oxbridge', in *Disreputable Pleasures: Less Virtuous Victorians at Play*, ed. by Mike Huggins and J.A. Mangan (London: Frank Cass, 2004), pp. 35–56 (p. 38).

38 Stefano Evangelista, 'Queer Colours', in *Colour Revolution*, pp. 197–203 (pp. 197–98).

39 Havelock Ellis, *Sexual Inversion* (Philadelphia: F. A. Davis, 1915), p. 299, quoted and discussed in Evangelista, 'Queer Colours', p. 198.

Class prejudice toward the 'lower' orders appears in another skit, 'Townee' (1912). This made fun of a young man from the city of Oxford who was not associated with the university (in contradistinction to students, known as 'gowns' after their academic robes). He is a masculine 'ladykiller' who thinks himself 'really rigged up in the pink of fashion' complete with a 'rainbow-hued' tie, the colours of which 'faded half-imperceptibly into one another'.⁴⁰ The implication is that he has ineptly combined the flashy style of the aristocratic bloods with the perverse colour sensitivity of the aesthetes (which will be explored in more detail later in this chapter), to disastrous results. Such class prejudice stands in contrast to contemporary queer ideals of cross-class relationships which challenged not only sexual norms but also the expectation in heterosexual marriage of making an alliance within one's own social class.⁴¹ We may now condemn John Addington Symonds, who collaborated with Ellis in his work on inversion, as one who fetishised and objectified working-class men, but his views were radical in his own times. Much the same point could be made about those who advocated eroticised mixed-race relationships.

All this shows that colourfulness in skin tone and clothing was only respected by male students in specific circumstances. The open embrace of diversity could be imagined but only as a ludic vision of the future. White male privilege was deeply entrenched at these universities at the end of the nineteenth century, but it was not entirely secure. It was for this reason that the visible boundaries of normativity were being shored up, even as they were also sometimes problematised, through satire that zeroed in on intersections of class, race, gender and, as we shall see next, sexuality. It was in this climate that the aforementioned Dabblers debated a motion in late February 1906 on 'the life of the average undergraduate' from which the mover 'excluded all Blacks[,] pub crawlers, green carnations and ultra aesthetes'.⁴²

40 'Townee', *Isis*, 27 January 1912, 147.

41 Evangelista, 'Queer Colours', p. 200.

42 Undated debate, c. late February 1906; Dabblers Society Minute Book 1904–1907, Rec 4.4, reproduced courtesy of the Master and Fellows of Trinity College, Cambridge.

Queerly Colourful Faiths, 1874 to 1895

Late Victorian aestheticism and decadence were partly queer enterprises, but Oscar Wilde's conviction for gross indecency in 1895 cemented the idea for some students that they were substantially so. This meant that *fin-de-siècle* style was open for condemnation or appropriation by new generations of young men in the early twentieth century. Arguments that Wilde's comic plays were indebted to the style of black minstrelsy would more firmly place his work further outside the 'average' as defined and defended in the Cambridge of 1906.⁴³ Yet Wilde was never 'cancelled' in the early twenty-first-century sense by university students. His comedies continued to feature in private readings organised by literary clubs and performed (complete with female impersonation) by the many men-only undergraduate drama societies on a regular basis, although it is telling that *Salome* (1893)—the public performance of which was banned in Britain—was rarely even discussed. It was given a private reading by the Parnassus Club (Peterhouse, Cambridge) in 1909, albeit in association with an earnest discussion of the origin of elements in the play that were divergent or absent from the Bible.⁴⁴

After Wilde arrived in Oxford in 1874, he had a set of suits made up from materials in a loud check pattern along the lines of those worn by sporty 'bloods', and it took a little while before he began to embrace the aesthetic styles for which he was to become (in)famous.⁴⁵ The deluge of satire that was shortly to follow Wilde's ascent to celebrity status included contributions from members of his former university, such as 'How Utter' (c.1880) by John Bowyer Buchanan Nichols. This showed Wilde contemplating a lily within a neo-classical-style border featuring busts of women and of a long-haired youth with pendants labelled 'O. W' (Figure 7.1).⁴⁶ This is in line with much early mockery of Wilde

43 Michèle Mendelssohn, *Making Oscar Wilde* (Oxford: Oxford University Press, 2018), discussed by Andrew Holleran, 'Oscar in Blackface', *Gay and Lesbian Review Worldwide*, 25.6 (2018), 19–22.

44 Play reading, 7 November 1909, Parnassus Club Minute Book 1904–1924, GBR/0273/Pet MSS 700, archives of Peterhouse, Cambridge.

45 Matthew Sturgis, *Oscar: A Life* (London: Head of Zeus, 2018), pp. 67, 98.

46 Photograph of John Nichols, 'How Utter' (Oxford: Thomas Shrimpton and Son, c.1880), 118 x 173 mm; G.A. Oxon. 4o 415, fol. 706/John Johnson 697, The Bodleian Libraries, University of Oxford. The references are to the two sets of these caricatures

as being an effeminate ladies' man, although there is some evidence that he had already flirted with same-sex adulation when a student.⁴⁷ This was one of a huge number of satirical prints drawn primarily by students from the University of Oxford that were published by the book-binders and photographers Thomas Shrimpton and Son. They often showed recognisable members of the university and were widely collected there.⁴⁸ The equation of Wilde with the supposedly feminine world of décor(ation) is paralleled in Shrimpton's prints of this date that focus on Anglo-Catholic priests who, as a group, were beginning to fall under suspicion of sexual and gender non-conformity. Their frequent advocacy of clerical celibacy led to them being attacked for being either unmanly or else potential abusers of women.⁴⁹ One example of such parody is an anonymous drawing captioned "The handsome Ritualistic Priest arrayed in purple and fine linen, irresistible with the "Devout Women"" (c.1880) (Figure 7.2).⁵⁰ The caption makes ironic reference to Luke 16:19 (King James version), 'There was a certain rich man, which was clothed in purple and fine linen, and fared sumptuously every day'. Few of Shrimpton's cartoons were hand-coloured, and this emphasises the importance of colour to the parody of this form of contemporary religiosity.

Ritualists were people in the Church of England who drew their inspiration from the Oxford Movement that had begun in the 1830s. They formed what was known as a High Church party and were to later to become known as Anglo-Catholics. They advocated for a more elaborate form of ecclesiastical ritual involving the increasing use of colourful vestments and other objects and adornments that had been largely abandoned as a result of the Protestant Reformation.

in the library, with the second being that in the John Johnson Collection of Printed Ephemera.

47 Sturgis, *Oscar*, p. 99.

48 Personal communication with Colin Harris, February 2019, and see Harris, 'Shrimpton and Son's "Oxford Caricatures": A New Resource for the Study of Student Life in Nineteenth-Century Oxford', *Bodleian Library Record*, 30.1-2 (2017), 61-83.

49 Dominic Janes, *Visions of Queer Martyrdom from John Henry Newman to Derek Jarman* (Chicago: University of Chicago Press, 2015), pp. 1-29.

50 Photograph of artist unknown, 'Ritualistic Priest' (Oxford: Thomas Shrimpton and Son, c.1880), 124x154 mm; G.A. Oxon. 4o 415, fol. 629/John Johnson 629 (the latter being the hand-coloured version), The Bodleian Libraries, University of Oxford.



Fig. 7.1. Photograph of John Nichols, *How Utter* (Oxford: Thomas Shrimpton and Son, c.1880), 118 x 173 mm, John Johnson Collection Caricatures 4, no. 697, Bodleian Library, University of Oxford.



Fig. 7.2. Artist unknown, photograph of hand-coloured version, *Ritualistic Priest* (Oxford: Thomas Shrimpton and Son, c.1880), 124 x 154 mm, John Johnson Collection Caricatures 4, no. 629, Bodleian Library, University of Oxford.

The result was an aestheticised form of worship that was attacked as being the vanguard of Popery by the opposing evangelical Low Church party within the Church of England.⁵¹ Disputes over such matters in the 1840s and 1850s prefigured controversies over mid- and late Victorian aestheticism, as when a critic argued, in 1851, that ecclesiastical colour is often 'considered immoral [...] because it is an immediate sensation and makes its effects independently of those ordered memories which are the basis of morality'.⁵² Student satire made fun of not only overly effete men but also those who were obsessively sporty, and in a similar fashion, the extremes of the high and low Church parties in Anglicanism came in for parody. For instance, in another Shrimpton's cartoon which was simply entitled 'Protestant Ritualism', two Anglican ministers are shown as if performing the mass in the Anglo-Catholic fashion (facing east at the High Altar and, thus, looking away from the congregation) but with a blank wall behind and a plain altar cloth with simply a cushion to hold a copy of the Bible and a communion plate.⁵³ The only applied colour is a line of red on the dress of one of the clerics to show that he is wearing an Oxford MA hood.

The 'handsome Ritualistic Priest' (Figure 7.2) can be compared with another print showing the campily posed Rev. Horatio Morphiamoses who boasts of attracting some of the 'most exalted and loveliest females' to his confessional, whilst the more masculine presenting Rev. Skoggs says that women will not come to him but 'I can get hold of some boys'.⁵⁴ At this time, the practice of confession in private to a priest was being attacked as a dangerously Catholicising innovation in the Church of England and one that was alleged to involve the potential for sexual impropriety.⁵⁵ The implication was either that such priests were willing to feminise their own gender in order to seduce women, or else they had

51 Dominic Janes, *Victorian Reformation: The Fight over Idolatry in the Church of England, 1840–1860* (Oxford: Oxford University Press, 2009).

52 *Ibid.*, p. 33.

53 Photograph of artist unknown, 'Protestant Ritual' (Oxford: Thomas Shrimpton and Son, c.1875), 157 x 124 mm; G.A. Oxon 4o 413, fol. 291/John Johnson 280, The Bodleian Libraries, University of Oxford.

54 Photograph of artist unknown, 'Fathers Skoggs and Morphiamoses' (Oxford: Thomas Shrimpton and Son, c.1882), 125 x 158 mm; G.A. Oxon. 4o 416, fol. 866/John Johnson 857, The Bodleian Libraries, University of Oxford.

55 Dominic Janes, 'The Confessional Unmasked: Religious Merchandise and Obscenity in Victorian England', *Victorian Literature and Culture*, 41.4 (2013), 677–90.

an interest in boys. The latter could be seen as a normative stance in so far as manly men were expected to impart masculine virtues to the next generation, but there was some degree of awareness of other possibilities. Edward Carpenter, one of Britain's first homosexual rights campaigners, wrote in the 1905 edition of his epic poem, *Towards Democracy*, of the 'young man who organises his boys from the slums' as one aspect of contemporary queer life in London.⁵⁶ Indeed, there was an investigation in 1907 by Oxford's proctors (the university's disciplinary officials) into suggestions of sexual impropriety on the part of those organising boys' clubs in the city.⁵⁷

Allegedly flamboyant religiosity was, furthermore, associated with theatricality, as in another Shrimpton's print which advanced a mock proposal for the 'Church Stage Guild' in Oxford by depicting three figures—including the Rev. John Prideaux Lightfoot, Rector of Exeter College—as aesthetes holding a lily, a peacock feather and a sunflower, respectively.⁵⁸ Exeter was also associated with aestheticised religion as a result of its new and spectacularly lavish chapel by Sir George Gilbert Scott. This building, partly inspired by the Sainte-Chapelle in Paris, was erected in the late 1850s and was completed with a splendid series of stained-glass windows by the firm of Clayton and Bell. The Church and Stage Guild had been founded in 1879 by the Rev. Stewart Headlam who was to put up half of Wilde's bail money, accompany him to and from court and wait at the prison gate on his release in 1897.⁵⁹

Practising the cult of beauty, whether it be classical or Christian, was, therefore, implied to be partly a pose. Much the same could be said for Orientalist aestheticising of Islam. In 1888 Robert Ross, who, it is thought, had become Wilde's lover two years earlier, published a satirical pen portrait in a rapidly suppressed Cambridge student publication, *The*

56 Edward Carpenter, *Towards Democracy* (London: GMP, 1985), p. 325, discussed by Matt Cook, *London and the Culture of Homosexuality, 1885–1914*, Cambridge Studies in Nineteenth-Century Literature and Culture 39 (Cambridge: Cambridge University Press, 2003), pp. 38, 137.

57 Proctors' Records on Boys' Clubs and Life Drawing; Pr1/23/9/3, archives, The Bodleian Libraries, University of Oxford.

58 Photograph of artist unknown, 'The Inner Brotherhood' (Oxford: Thomas Shrimpton and Son, c.1882), 153 x 135 mm; G.A. Oxon. 4o 416, fol. 910/John Johnson 906, The Bodleian Libraries, University of Oxford.

59 Richard Foulkes, *Church and Stage in Victorian England* (Cambridge: Cambridge University Press, 1997), p. 177.

Gadfly. This described a visit to the rooms of his socially prominent—and queer—history tutor at King’s College, Oscar Browning, who is found lolling on a divan while ‘two Arab boys severally support on each side an ash tray and a gold cigarette box’. In case the implications remained unclear to the innocent reader, it was further alleged that Browning held regular events at which ‘all the [male] Undergraduates who are clever or handsome, or have any qualities at all, are sure to be met’.⁶⁰ The implicit queerness of Shrimpton’s cartoons is here made all but explicit.

A further point about these satirical depictions, some of them indulgently cordial and others overtly hostile, is that they show the links that were starting to be made not simply between racial diversity and gender non-conformity but also with sexual indeterminacy. Some of the examples of this from the Edwardian period are crude, including depictions of ‘Chaa-Lee’s Aunt from China’ and ‘Mahamed Saladin Ben Punka’ as bizarre, intersexed ‘Orientals’.⁶¹ Browning was, notably, presented—in verse imitating the ludic style of Edward Lear—as a man who did not partake in such processes of othering in so far as ‘he befriends the collegiate negro/And other exaqueous fish’ (i.e. fish out of water).⁶² A negative interpretation of this is that Browning was seen as a predatory older man who objectified non-white students, but a more generous understanding is that he was keen to ally himself with others who were outsiders to the mainstream of university life. We will probably never be able to precisely fix the degree to which queerness was being exposed and condemned or highlighted and expressed in many of these (mostly anonymous) student articles and drawings. What is quite clear is that Wilde’s same-sex passions were becoming ever more overtly discussed and, indeed, depicted, as in ‘A Dream of Décadence [sic] on the [River] Cherwell’, a cartoon ‘by our decayed artist’ in a promptly suppressed Oxford periodical, *The New Rattle*.⁶³ This showed a bloated

60 Anonymous [Robert Ross], ‘O-C-R B---NG at Home’, *Gadfly*, 15 November 1888, 1–2; see also Dominic Janes, ‘The “Curious Effects” of Acting: Homosexuality, Theatre and Female Impersonation at the University of Cambridge, 1900–1939’, *Twentieth Century British History*, 33.2 (2022), 169–202 (pp. 176–79), and Jane Marcus, review, *Ian Anstruther, Oscar Browning: A Biography*, *Victorian Studies*, 28 (1985), 556–58.

61 George Cooper, ‘The Popular Craze for Chinese Plays’, *Granta*, 16 November 1901, 87, captioned ‘New Version of an Old Play “Chaa-Lee’s Aunt from China”’, and M.C., ‘Types of the Times. 2. Mahamed Saladin Ben Punka’, *Isis*, 7 November 1903, 35–36.

62 ‘How Pleasant to Know the O.B.’, *Granta*, 27 October 1894, 21.

63 ‘JCR Spider’, ‘A Dream of Décadence on the Cherwell’, *New Rattle* 4, no. 2, 20 May 1893, inset before p. 3, discussed in Janes, *Oscar Wilde Prefigured*, p. 204. A junior

Wilde and a diminutive, cross-dressed Lord Alfred Douglas (who was a student at the university at the time) consorting in a rowing boat.

Another, only mildly less overt example was a spoof, published in *Granta*, of Robert Hichens's novel *The Green Carnation* (1894). This was, itself, an essentially transparent parody of Oscar Wilde's circle of friends in general and his close relationship with Bosie Douglas in particular.⁶⁴ This story, 'The Blue Pink' (a 'pink' being another name for a carnation), was accompanied by a cartoon showing Mr Amarinth, looking like Wilde, 'sprawling elegantly on the sofa', much as Ross had imagined Browning on his divan. Douglas appears as Reggie, an athlete ready to play football for the university: 'He was exquisitely beautiful and exquisitely aware of it [...] He assumed several different poses, such as a Greek god playing half-back might assume'.⁶⁵ Yet he is thrown into confusion by the clash between the colour of his jacket as a sports 'blue' and the hue of the carnation in his buttonhole. The implication is that as the flower now signalled queer desire as an element of the worship of beauty, so sport was starting to be coded as standing for conformity not only in gender performance but also in sexual object choice.

Because sexual non-conformity was often depicted as ugly, the queer embrace of the cult of beauty can be seen—as in the twentieth-century use of the term 'gay'—as a way to counter popular prejudice. The decadent turn to the open embrace of deviance as perversely beautiful can, therefore, be seen as a step towards the open declaration of marginalised tastes. Queer people may have become adept at focusing on colour in order to covertly signal alternative sexual preferences or, as in the cult of art for art's sake, as a way to step aside from the often hostile moralism that suffused 'realistic' representation.⁶⁶ Indeed, Havelock Ellis's concern to explore this issue may 'give us a glimpse into the cultural construction of the turn-of-the-century homosexual as a chromophile—an individual marked by a heightened sensitivity to colour'.⁶⁷

common room (JCR) functioned as a social club for a college's undergraduates.

64 Robert Hichens, *The Green Carnation* (London: William Heinemann, 1894), discussed in Janes, *Oscar Wilde Prefigured*, pp. 202–05.

65 'The Blue Pink', *Granta*, 1 December 1894, 99–100.

66 Stefano Evangelista and Charlotte Ribeyrol, 'Colour for Colour's Sake', in *Colour Revolution*, pp. 173–91 (p. 173).

67 Stefano Evangelista, 'Queer Colours', p. 198.

Queer Fears and Opportunities after 1895

The arrest and trial of Oscar Wilde was reported factually in the local Oxford and Cambridge papers and there was nothing to stop students from consulting the national press either.⁶⁸ His disgrace certainly did not stop students talking about him, nor, it was alleged, imitating him. Editorials in the student press, such as one entitled "'Iridescent Hues." A Warning to Freshmen [i.e. first year undergraduates]' (1896), alerted them to the perils of reading decadent literature and wearing suits made of blue or green.⁶⁹ These were the two key colours of the iridescent feathers of the (male) peacock that contrasted with the drab tones of the (female) peahen. Such plumage had by this time become well established as emblematic not only of dandified masculine preening and 'peacocking' but also of an allegedly Oriental style, bearing in mind that peacocks are native to India. Iridescence also implied a tendency to change hue depending upon the light, suggesting a potentially subversive quality of indeterminacy. This latter quality, arguably, was also invoked by a queer Oxford student, John Francis Bloxam, when he named his short-lived periodical, *The Chameleon* (1894); this contained not only his own story about the love between a priest and a male youth, but also Wilde's 'Phrases and Philosophies for the Use of the Young'.⁷⁰

The influence of Wilde was, perhaps not surprisingly, more in evidence in Oxford than in Cambridge. Two pieces by the same author in the Cambridge periodical *Granta* alleged that there was some decadence persisting in Cambridge in 1897, but that it continued to flourish in Oxford 'like a green carnation tree'; and that the 'Cambridge Philistine, with his dirty chemical hands, torn Norfolk jacket, often plain manners, but sound science' stood in sharp contrast to the effeminates who, with 'an aesthetic little green boot-lace of a tie' and 'a wee little kind of hypertrophied Eton voice', mingled with the proper gentleman at Oxford.⁷¹ A decade later the cat at Wilde's old college, Magdalen, was called Oscar, according to Arthur Mackworth writing in *Varsity*

68 For example, 'The Oscar Wilde Case', *Oxford Review*, 29 April 1895, 3. Like *Isis*, this was an 'undergraduates' journal' published during term time.

69 Editorial, "'Iridescent Hues." A Warning to Freshmen', *Isis*, 24 October 1896, 15–16.

70 O. Wilde, 'Phrases and Philosophies for the Use of the Young', *Chameleon* 1, no. 1 (1894), 1–3.

71 B., 'Some Oxford Men and Manners', *Granta*, 20 November 1897, 95–96 (p. 95); B., 'Decadence', *Granta*, 27 November 1897, 111.

Vices, 'but for what reason I was unable to discover'.⁷² He did, however, elaborate on the 'types of vicious men' present in the college, including a decadent who was addicted to smoking, refused to shave and painted rings under his eyes in order to appear dissipated, and an Anglo-Catholic who was obsessed with his slim figure, lunched on celery sticks and got assaulted by drunk sportsmen.⁷³

Such denunciations, combined with warnings including the one published in *Granta* in 1904 that described decadence as a form of madness in London and Paris that had claimed the lives of various artists including that of the author of *The Ballad of Reading Gaol* (1898), seem only to have added to Wilde's posthumous readership.⁷⁴ English literature was slow to get off the ground as an academic discipline and drama was never more than a hobby for most students in Edwardian Oxbridge, but if the works of Wilde were not on the curriculum they were certainly being read and contested by students, as can be witnessed in the (anonymous) praise and parody of *De Profundis* (1897) on its first publication in 1905.⁷⁵ Queer life in late Victorian and Edwardian Oxbridge was lived primarily in the closet, but unusually close relationships between male students did not go unremarked even if it is usually impossible to tell whether satire was inspired by stereotypes alone or by real relationships between students. One such satirical narrative, 'The Reformation of a Decadent', described the close friendship between Bunthorne (the name of the sham aesthetic poet in Gilbert and Sullivan's *Patience*, 1881, which Wilde was to promote in his tour of the United States), and Carolwood, who despite being 'beefy and athletic in appearance' was his bosom companion—'decadence was their ideal, *De Profundis* their favourite'.⁷⁶

One strategy for exploring the world of male same-sex desire at

72 C.H. Davies, 'High Street, Oxford', *Varsity Vices: The Oxford Truth* (1908), pp. 2–3 (p. 2).

73 Arthur Mackworth, 'Types of Vicious Men', *Varsity Vices: The Oxford Truth* (1908), pp. 9–10 (p. 10).

74 C.R.-G., 'Vignette', *Granta*, 17 February 1904, 211–12.

75 D.J. Palmer, *The Rise of English Studies: An Account of the Study of English Language and Literature from Its Origins to the Making of the Oxford English School* (London: Oxford University Press, 1965), and compare the anonymous review of Wilde, 'De Profundis', *Varsity*, 23 February 1905, 626, which hailed its 'brilliant author', with the satirical piece 'The Aesthete's Confession (after Reading "De Profundis")', *Granta*, 11 May 1905, 222.

76 'The Reformation of a Decadent (an Idyll)', *Varsity*, 15 November 1906, 89 and 91 (p. 89).

Oxford and Cambridge is to look at novels written by authors whom we know to have been homosexual, such as E. F. Benson, who attended King's College, Cambridge, graduating in 1891, and, for a later comparison, (John) Beverley Nichols, who attended Balliol College, Oxford, graduating in 1921.⁷⁷ Benson's autobiographical novel *The Babe. B.A.: Being the Uneventful History of a Young Gentleman at Cambridge University* (1897) derived its title from contemporary student slang in which 'babe' (i.e. baby) was employed to refer to a (potentially androgynous) youth who did not yet need to shave. Apart from the eponymous undergraduate, the book features a character based on Oscar Browning in the form of the history tutor Mr Stewart, who is described as looking like something 'out of the *Yellow Book* by Aubrey Beardsley'.⁷⁸ His tastes tended to the aesthetic. He said, for instance, of his favourite liquor Chartreuse, 'what a lovely colour it is. A decadent, abnormal colour, the colour of a spoiled piece of soul-fabric. Yes, quite delicious'.⁷⁹ An important aspect of student life for the Babe is cross-dressing, both merely for a lark, and on the (same-sex) student stage. After one performance, a student from Heidelberg 'thought she was a woman, and [...] fell in love with her on the spot, and was disposed to take it as a personal insult that the Babe was of the sex that Nature made him [...] Every night at the fall of the curtain, the Babe was called back again and again, every night the whole house rose at him like one man, and the florist outside the theatre must have realised a competence for the rest of his days'.⁸⁰

Such gender confusion might suggest transgender identities today, and was a core component of the inversion theory of homosexuality at the time, but it should be emphasised that aesthetic dons and cross-dressing

77 Brian Masters, *The Life of E. F. Benson* (London: Chatto and Windus, 1991), pp. 81–93, 124; Sayoni Basu, 'Benson, Edward Frederic (1867–1940), novelist', *Oxford Dictionary of National Biography*, May 16, 2005, <https://doi.org/10.1093/ref:odnb/30713>; Simon Goldhill, *A Very Queer Family Indeed: Sex, Religion, and the Bensons in Victorian Britain* (Chicago: University of Chicago Press, 2016), p. 63; Bryan Connon, *Beverley Nichols: A Life* (London: Constable, 1991), pp. 72–99; Brian Connon and Clare L. Taylor, 'Nichols, (John) Beverley (1898–1983), writer', *Oxford Dictionary of National Biography*, 23 September 2004, <https://doi.org/10.1093/ref:odnb/31497>.

78 E.F. Benson, *The Babe. B.A.* (London: G. P. Putnam, 1897), p. 101; and see G. Kitson Clark, 'A Hundred Years of the Teaching of History at Cambridge, 1873–1973', *Historical Journal*, 16.3 (1973), 535–53 (p. 543).

79 Benson, *The Babe*, p. 24.

80 *Ibid.*, p. 209.

students were everyday elements of the university scene and were not publicly read as homosexual before the early 1930s.⁸¹ Nevertheless, insinuations of queerness as an aspect of female impersonation were being made after Wilde's trials, as in 'Ye Clever Æsthete' (1896), a verse in the style of Gilbert and Sullivan, when it alleged 'he's rather fond of acting if he wears a pretty dress', which implied not merely cross-dressing but also chromatic drag.⁸² Gender confusion was also presented by some male students as an explanation for the campaign for women's suffrage. In 1908, *Granta* published 'Votes for Women' which was, in fact, an anti-suffrage poem that claimed that 'the nation/Revolts from this growth epicene/Of decadent civilisation/Male-female, betwixt and between'.⁸³

There were many at the time who held that the manly rigours of war would put a stop to such gender indeterminacy. This was the point of a wartime cartoon captioned '1913–1916', showing a drawing of a languid aesthete with a cigarette on the one side and a normative man with a coat and pipe on the other.⁸⁴ What was actually to happen, post-war, was rather different. There was something of a fashionable craze for a new aestheticism in the mid-1920s that saw men such as the future fashion designer Cecil Beaton not merely cross-dressing on stage in Cambridge, but wearing heavy make-up on a daily basis. His diaries show the ways in which student theatre provided an entrée into circles of men interested in queer sex.⁸⁵ However, according to another aesthete of the time, Harold Acton (writing in a review of Osbert Burdett's *The Beardsley Period*), Cambridge was still lagging behind: 'The period is over, but the attitude of mind has survived it, in Oxford more than elsewhere'.⁸⁶

Beverly Nichols's novel *Patchwork* (1921) has many similarities to Benson's *The Babe*. Indeed, it even redeploys the earlier novel's title by using it as the name of a student publication that parodies Nichols's

81 Dominic Janes, 'The Varsity Drag: Gender, Sexuality and Cross-Dressing at the University of Cambridge, 1850–1950', *Journal of Social History*, 55.3 (2022), 695–723.

82 'Tintinnabulum', 'Ye Clever Æsthete', *Isis*, 23 May 1896, 268–69 (p. 268).

83 'Votes for Women', *Granta*, 11 March 1908, 232–33 (p. 233).

84 '1913–1916', *Varsity*, 23 February 1916, 5. *Isis* and *Varsity* were incorporated into one periodical during World War One.

85 Dominic Janes, 'The "Curious Effects" of Acting'.

86 Harold Acton, review, Osbert Burdett, *The Beardsley Period*, *Cherwell*, 14 February 1925, 142–43 (p. 142).

main protagonist, Ray.⁸⁷ This character is, moreover, essentially Nichols himself, since his novel was, like the earlier book, both autobiographical and careful not to be too obvious about same-sex desire.⁸⁸ The plot of *Patchwork* parallels his own student career, which saw him relaunching *The Isis* after the war and becoming President of the Oxford Union debating society. Ray, we learn, is excited by the thought of recovering the world of queer Victorian Oxford. He aspires to buy rare editions of works by Walter Pater and does manage to purchase a set of Beardsley plates from Wilde's *Salome* from the library of Robert Ross.⁸⁹ People, he thinks, should be free to talk of decadence, do what they want, and not be judged by the colours they wear—after all, he says, it is not as if we are now under conscription in the army.⁹⁰ He even manages to host a dinner party attended by the physically towering presence of Osbert Wilde (perhaps a conflation of Osbert Sitwell and Wilde), who was known as Oscar.⁹¹

Ray enjoys befriending Indian students and relishes the fact that his college, Balliol, has a reputation for being open to people of colour.⁹² It would be an exaggeration to say that aesthetic and queer people and men of colour teamed up in some sort of rainbow alliance, but they do seem to have shared a more inclusive approach to diversity. Writing in 1901 of a Cambridge graduation ceremony half a century earlier, A. C. Benson—who, like his brother E. F. Benson, was homosexual—recalled an event when a 'boisterous individual' shouted racist abuse at a West African student. This was, however, answered by a 'pale slim undergraduate' who cried out 'shame, shame! Three groans for you, Sir!'⁹³ The courageous voice was that of Benson's own father who, when archbishop of Canterbury, was to be parodied in *Punch* for queerly aesthetic tastes.⁹⁴ A stereotypical division between sporty, conservative imperialists and radical aesthetes that was widespread in interwar student periodicals originated in the

87 Beverley Nichols, *Patchwork* (London: Chatto and Windus, 1921), p. 177.

88 Erica Brown, 'The Rise and Fall of "the Original Bright Young Thing": Beverley Nichols, *Crazy Pavements* (1927) and Popular Authorship', *Review of English Studies*, 66.273 (2015), 144–63 (pp. 145, 158), and Connon, *Beverley Nichols*, p. 98.

89 Nichols, *Patchwork*, pp. 22, 60.

90 *Ibid.*, pp. 171–72.

91 *Ibid.*, p. 284.

92 *Ibid.*, p. 32.

93 A.C. Benson, quoted in Hilary Perraton, *A History of Foreign Students in Britain* (Basingstoke: Palgrave Macmillan, 2014), p. 151.

94 Dominic Janes, *Visions of Queer Martyrdom*, pp. 145–47.

late nineteenth century. Examples of this come from the pen of George du Maurier (who frequently lampooned Wilde) in cartoons such as 'The Cimabue Browns'—notice the chromatic bathos of the surname—published in *Punch* in 1881, where the down-to-earth grandfather 'fresh from Ceylon' (where he, we assume, did not 'go native') is bemused by the aesthetic tastes of his younger relatives.⁹⁵

The styles and colours of the decadent nineties seem to have provided a template on which students could base their nascent queer personas. Just a year after Wilde's death, *Varsity* had announced that there was a rumour that a new club would be formed of those 'dreaming of sins I simply daren't commit'.⁹⁶ Its uniform would take the form of a brown, green and gold dressing gown. Late Victorian aestheticism had a subversive appeal for successive generations of students. Student periodicals consoled their 'average' readers with the thought that this was just posing at perversion on the part of young men who do no more than 'dream of every form of vice'.⁹⁷ Moreover, as in the Victorian satires, some of these seeming attacks may have been self-parodies that aimed to mock the unsophisticated. What seems clear, however, both pre- and post-World War One, is the idea that decadence required a leisured combination of outré literature and exoticised material culture.⁹⁸ A writer explained the 'symptoms and cure' of decadence in *Isis* in 1927. This disease is described as beginning at school with a phase of religious enthusiasm, before moving to a craze for art and philosophising. This leads to the discovery of sex. Thrilled but puzzled, the youth looks to literature and reads his way through Aldous Huxley's *Antic Hay* (1923), Michael Arlen's *The Green Hat* (1924), and Wilde's *The Picture of Dorian Gray* (1890–1891). He then arrives at a perfect pitch of decadence at Oxford as he works his way through Joyce, Freud and Havelock Ellis. At this point, the patient 'affects ties of a languid mauve, cushions of jade green and gold-tipped cigarettes'.⁹⁹ The treatment for all this takes

95 Evangelista and Ribeyrol, 'Colour for Colour's Sake', pp. 182–83, and fig. 159.

96 B., 'The Last of the Decadents', *Varsity*, 19 November 1901, 339.

97 Editorial, 'The Author', 'Are We Sensual?' *Varsity*, 7 December 1905, 117 and 119 (p. 117).

98 For an extended discussion of the interwar period, see Dominic Janes, "'Chromatics and Vice": Male Students, Race and Queerness at the Universities of Oxford and Cambridge, 1890s to 1930s', *WerkstattGeschichte* 89 (2024), 73–92.

99 B.J.B., 'Decadence: Its Symptoms and Cure', *Isis*, 9 November 1927, 12.

the form of frequent doses of football, folk-dancing, Kipling, artistic leatherwork, Swedish drill and rowing.¹⁰⁰

Conclusion

It is clear that colour needs to be understood as part of the material culture of student life. Decadent performances linked the material realms of the desiring body and colourfully seductive adornments in a rejection of adherence to a disciplined code of exercise, behaviour and dress. Bright colour was allowed to the normative male, and even expected, when it signalled hard work—from an athlete's confident uniform to the vivid pink glow of his cheeks.¹⁰¹ It could even 'redeem' the presence of otherwise 'dubious' tones of 'man colour' from elsewhere around the globe.¹⁰² Colour was least troubling when it could be interpreted as an immaterial label. Normative whites could dissociate themselves from tones by simply undressing, while people of colour could not because hue was viewed as a material aspect of their bodies. The decadent white person was someone who allegedly showed such an unhealthy fascination for colour tones that they wanted to be materially stained and permanently defined by them—to become, artificially, of colour themselves. They thereby uncomfortably highlighted the dangerous potential of scientific modernity and its colour-fast dyes. Wearing attire of an ambiguous colour without an overt meaning raised the question, like that of the green carnation, of which recondite club it was a badge. The effect of the aesthetic embrace of subtle, strange and exotic hues was to problematise binary thinking and labelling implied by simplistic divisions between masculine and feminine, natural and artificial, and western and eastern. The colours of 'Oriental' leisure continued to signify queer decadence in a new, post-war age when the conservative public-school blues of the Oxbridge sporting establishment were widely identified as being politically opposed not only by Blacks and Indians but also by communist 'reds'. Such, it seems, was the enduringly subversive efficacy of mysterious hues as a means either to flaunt an aura of queerness or merely suggest it by means of 'the least hint of heliotrope'.¹⁰³

100 Correspondence, *Isis*, 16 November 1927, 19.

101 H.M.R., 'Song of a Pale Person', *Isis*, 25 May 1901, 302.

102 Editorial, 'Thoughts that Occur', p. 45.

103 H.L.H., 'Man Æsthetic', p. 93.

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8. ‘The Look of Measurement’: Colour and Sight in Victor Fulconis’s Depictions of the Indo-Caribbean in Martinique, 1883

Helena Neimann Erikstrup

I want to begin this chapter with two introductory ‘colour samples’: moments in which we see colour working in different ways, connected through the visual and the pigmented histories of empire and skin colour as playing out on the anthropologist’s and artist’s palettes. Fragmentary yet connected, these samples will help position us in the French colony of Martinique in the year 1883, when slavery had been abolished and indentured labour had taken its place. This will contribute to the subsequent discussion of race, skin colour and empire.¹

Colour Sample 1

In 1861, the pseudo-scientist Paul Broca (1824–1860) published *Les Instructions Générales pour Les Recherches et Observations Anthropologiques (Anatomie et Physiologie)*, a manual in which he provides information on how travellers should methodically record and measure who and what they encounter during their travels in accordance with the newly founded discipline of anthropology and report their findings back to the Société d’anthropologie de Paris, also founded by Broca. He

1 Parts of this chapter appear in my DPhil thesis, ‘Colour Concerns: The Palette of Race and Ecology in French-Martinican Art, 1847–1887’ (University of Oxford, 2024).

writes that the human is 'no more difficult to observe than an insect', and the book was therefore aiming to be a handy device that made sure that the observations of the anthropologist-traveller were done in a methodologically correct manner.² One of the key tools that Broca provides is a 'Tableau Chromatique', a table made of small rectangles in different non-white colours.³ Broca envisioned that the table colours would each match one skin colour, making it easy for the traveller to note down the 'precise' skin colour of the people observed. According to Broca, this was a much-needed help, because skin colour had so far been wrongly identified by looking towards known objects, like copper, bronze and mahogany.⁴ He was aware that it might be difficult sometimes to determine the right colour match but advises, for example, that the anthropologist should cut off a piece of the subject's hair if in doubt.⁵ This is a significant part of the chart: the anthropologist's forceful haptic contact with the subject of study. It was not enough to observe from a distance; rather, for a good result, it was essential to be up close and to take precise measurements. Anthropology was intimately tied to empire, with Fenneke Sysling arguing that anthropology 'provided a mental framework' to justify the project of empire in the discipline's desire to describe and explain the differences between Europeans and non-

2 Broca, *Les Instructions Générales pour Les Recherches et Observations Anthropologiques (Anatomie et Physiologie)* (Paris: Victor Masson et fils, 1865), p. 2: 'L'homme, cependant, n'est pas plus difficile à observer qu'une plante ou un insecte'.

3 <https://gallica.bnf.fr/ark:/12148/bpt6k6281965n/f149.item>.

4 Broca, *Les Instructions*, p. 4. 'Reconnaissant l'insuffisance des noms empruntés au vocabulaire des couleurs, les observateurs ont été obligés, dans beaucoup de cas, de recourir à des comparaisons avec des objets connus, tels que le cuivre, le bronze, l'acajou, le chocolat, l'épiderme de certains fruits, le cuir tanné, etc. Mais il n'est aucun de ces objets dont la teinte ne puisse varier de plusieurs tons, et ne puisse varier même quant à la nuance; puis, on rencontre fréquemment des teintes qui ne peuvent être comparées à celle d'aucun objet connu' [Recognising the inadequacy of terms borrowed from the vocabulary of colours, observers have been obliged, in many cases, to resort to comparisons with familiar objects, such as copper, bronze, mahogany, chocolate, the skin of certain fruits, tanned leather, etc. But there is no such object whose hue cannot vary by several shades, and cannot even vary in nuance; additionally, one frequently encounters hues that cannot be compared to that of any known object].

5 Broca, *Les Instructions*, 54. 'Lorsqu'ils hésiteront entre deux plusieurs couleurs, ils pourront faciliter leur appréciation coupant une petite mèche de cheveux qu'ils appliqueront à plat sur les couleurs mêmes' [When one is torn between two or more colours, one can make it easier to decide by cutting off a small lock of hair and laying it flat against the colours themselves].

Europeans, though always in favour of the Europeans.⁶ Anthropology thus grew from the Enlightenment desire to categorise and hierarchise human and non-human groups, increasingly facilitated by and reliant upon growing opportunities to encounter the non-European through the networks of empire, fostering the development of new pseudo-scientific disciplines in which colour, as seen through the example of Broca's table, became a key tool of identification.⁷

Colour Sample 2

The British Caribbean artist Keith Piper's (b.1960) art installation *The Coloureds' Codex, An Observers' Guide to Comparative Complexion* (2007) is a wooden paint box placed inside a museum vitrine.⁸ The fifteen pigment containers inside are systematically and carefully placed in marked-out squares. On the left side, the categories 'Field Negroes', 'House Negroes' and 'whites' are written, corresponding to each of the three rows of five containers. 'Field Negroes' covers colours from deep red to black; 'House Negroes' shows colours from light pinkish to orange; and 'whites' covers different shades of white and light pink. Underneath each paint container, further description is added, such as 'Standard Field' or 'White Artisan'. The interior of the lid is bolstered with a blue velvet fabric, with two of the same illustrations, showing a man measuring an enslaved man, on either side of a framed drawing with phrenological sketches. The paint box is one part of a larger installation work, named 'Lost Vitrines', which was commissioned by the Victoria and Albert Museum in London as part of their 2007 exhibition 'Uncomfortable Truths'.⁹ It contributes to discussions about histories of the relation between the classification of pigments and skin colour; between the scientific study of non-white people and the work

6 Fenneke Sysling 'Anthropology and Empire', in *The Routledge Handbook of Science and Empire*, ed. by Andrew Goss (London: Taylor & Francis Group, 2023), pp. 70–79 (p. 74).

7 Michael D. Harris, *Colored Pictures: Race and Visual Representation* (Chapel Hill, N.C.: University of North Carolina Press, 2003), p. 2.

8 <https://artsandculture.google.com/asset/the-coloureds-codex-an-overseers-guide-to-comparative-complexion-a-gentleman-s-guide-to-the-restraint-of-negroes-the-lost-vitrines-keith-piper/PgE6hOE4-XPIPQ?hl=en>.

9 Keith Piper, 'Lost Vitrines', Keithpiper.info (2024), <https://www.keithpiper.info/lostvitrines.html>.

of artists. Here, Piper's work *guides* the overseer in identifying different skin colours, so as to determine what 'type' of human each enslaved person was: who belonged to which classification, and thus the nature of the person's character. As a tool that assists in pinpointing skin colour in pigments, Piper's work visualises how the colonial relation was one of seeing and being seen as coloured. It understands how race was made real and upheld through pigment and paper. It visualises Frederick Cooper and Ann Laura Stoler's important point that 'the otherness of colonised persons was neither inherent nor stable; his or her difference had to be defined and maintained'.¹⁰ I begin by juxtaposing Broca and Piper's work because they both grapple with the questions and ideas which run as a red thread throughout this chapter: the making and remaking of race through systematic study in which colour was a favourite tool.

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Broca and Piper represent two different moments of colour-making, by different makers, at different locations and in different time periods. Where one assumes authority and directs the reader on how best to scientifically identify and categorise people of colour, the other mimics this very act and in doing so, disrupts the gesture in a subtle yet powerful way. Both colour samples are examples of how colour was a racialised tool used to guide looking and identification. Race relied upon the premise that skin colour was and is easily legible and a trustworthy source in making sense of people. The two examples demonstrate that colour was, as Michael Taussig would say, a 'colonial subject', as a racial marker, as a colour pigment and as an instrument for measurement.¹¹ Both examples also point towards what Jordanna Bailkin names 'the imperial palette' in the context of her study of the pigment Indian yellow, in which she shows how artists' palettes were deeply entangled in empire, both through the making of pigments and their availability, and in their depiction of

10 Frederick Cooper and Ann Laura Stoler, *Tensions of Empire: Colonial Cultures in a Bourgeois World* (Berkeley: California University Press, 1997), p. 7.

11 Michael T. Taussig, *What Color Is the Sacred?* (Chicago and London: University of Chicago Press, 2009), p. 159.

the new colonised subjects.¹² In the following discussion, I build upon Bailkin to include not only palettes but a wide array of colour-making tools, and in doing so, I position colour as key for understanding the colonial experience in nineteenth-century Martinique, both as a tool of categorisation and a prism the colony was seen through, one which was continually and simultaneously confirmed and contested.¹³

At the centre of my analysis are two drawings made by the Frenchman Victor Pierre Fulconis shortly after he had arrived on the French Caribbean colony of Martinique in 1882 to take up a newly created position as a drawing teacher at the local schools of Lycée de Saint Pierre and Pensionnat Colonial (Figures 8.1 and 8.2).¹⁴ In the two drawings, Fulconis depicts members of the Indo-Caribbean population in Martinique, one sheet dedicated to female and the other to male figures. The drawings analysed in this chapter are only two in an album containing drawings that he completed between 1882 and 1884, which is now held in the Archives Territoriales de Martinique but which has been scarcely studied by scholars. The album contains a wide variety of imagery drawn from his encounters on the island, from fish, birds and plant-life to the repeated figure of the manual labourer, particularly the female laundress. Artist-travellers in the Caribbean tended to be particularly obsessed with depicting the African-Caribbean female, so these drawings of the Indo-Caribbean present a rare moment in which the history of indenture in Martinique is captured in colour. Before beginning my close analysis of the two drawings, I want to take a moment to first say a few words about the invisible whiteness that structures them, and sketch out the historical context of the drawings, with both elements adding to our discussion of Fulconis's work.

12 Jordanna Bailkin, 'Indian Yellow: Making and Breaking the Imperial Palette', *Journal of Material Culture*, 10 (2005), 197–214.

13 *Ibid.*, p. 159.

14 Born in Algeria and the son of the sculptor Louis Guillaume Fulconis (1818–1873), Fulconis has been scarcely studied thus far. Two important exceptions are the recent online contribution by Christelle Lozère, created as part of her fellowship at the Institut national d'histoire de l'art in Paris: 'Rendez-vous numériques en histoire de l'art des Antilles I Victor Fulconis'; *YouTube* (2023), https://www.youtube.com/watch?v=YkCPRc7oo2c&list=PLsI8NWzVv6T2nsvxr8KtOI_INcqXzGa8W&index=5; and Patrick Daum, 'Vie et œuvre des sculpteurs Guillaume Fulconis (1818–1873) et Victor Fulconis (1851–1913)' (PhD thesis, University of Lille, 1986). I am drawing here on Daum's biography of Fulconis: see p. 189.

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One of the primary ways in which colour was central to colonial life was through skin colour. Scholars including Mechthild Fend and Roxann Wheeler argue that skin colour was a fluid but central set of categories of the seventeenth and eighteenth centuries that gave way throughout the nineteenth century to biological determinism and more fixed, rigid boundaries of racial difference.¹⁵ In Martinique, I argue, these assumed boundaries between Black and white are not so helpful for understanding its variegated landscape of racial mixing. The drawings factor into the richly coloured fabric of Martinique and are examples of how a multiplicity of colours remained a defining feature that shaped experiences of empire, even after emancipation. We see throughout Fulconis's album how he is interested in capturing the varieties of skin colours he observes on the island, except for whiteness. We saw at the beginning how Piper's paint box includes the category of 'whites' accompanied by five colours of white, three being strikingly white and two others being beige-toned. Here, Piper's contemporary intervention makes whiteness visible as a racial identification, one that is often hidden or deemed a non-colour in archival matter, as the critical discipline of whiteness studies has sought to illuminate since the 1990s.¹⁶

Fulconis does not depict white figures in the two drawings I examine, but that does not mean whiteness (as a gaze, concept and structure) is not *there*. Building on Sara Ahmed's argument that 'whiteness is a bodily form of privilege', whiteness functions as a mode of looking and experiencing, which might be invisible when looking at the drawings, but which governs and makes them possible.¹⁷ Nicholas Mirzoeff has shown how race was and continues to be made through ways of seeing. In his most recent book (2023), Mirzoeff builds upon his previous work on the 'Overseer' and introduces the term 'White Sight' to encapsulate

15 Mechthild Fend, *Fleshing out surfaces: skin in French art and medicine, 1650–1850* (Manchester: Manchester University Press, 2017); Roxann Wheeler, *The Complexion of Race: Categories of Difference in Eighteenth-Century British Culture* (Philadelphia: University of Pennsylvania Press, 2010); <https://doi.org/10.9783/9780812200140>.

16 See Richard Dyer, *White* (London: Routledge, 1997) for one of the first interventions into whiteness studies. I am also drawing here on the work of Gloria Wekker, *White Innocence: Paradoxes of Colonialism and Race* (Durham: Duke University Press, 2016).

17 Sara Ahmed, 'A Phenomenology of Whiteness', *Feminist Theory*, 8 (2007), 149–68 (p. 161), <https://doi.org/10.1177/1464700107078139>.

how a white regime of looking enables and structures white supremacy, again recalling Piper's visualisation of the Overseer's framework. White Sight 'surveys land and places all life under surveillance'.¹⁸ As such, although the drawings do not explicitly show whiteness, it bears foregrounding and acknowledging from the outset that they are products of whiteness and moments of white self-fashioning. Maeve McCusker has honed in on the Martinican context more specifically to interrogate the particularities of the whiteness enacted by the plantation and landowner class, called *békés*, and the poorer working class in the colony, known as the *petit blancs*.¹⁹ I position Fulconis instead as a part of a group of affluent white men who came from the metropole to pursue a career.²⁰ He took advantage of the recent educational reforms of the French Minister of Education Jules Ferry (1832–1893), which were implemented across the French Empire and incorporated drawing as part of the syllabus.²¹ As an educator, Fulconis entered and settled into a landscape of racial classification which was not hierarchically organised along white-Black binaries, but rather a complex mixture of skin colours, yet he nonetheless assumed a position of immense privilege, later allowing him to marry into a wealthy Creole family.²²

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In order to be able to fully understand Fulconis's drawings, we also need to consider the history of indenture on the island. The 1848 abolition of slavery in the French Antilles might have been marked as a significant moment of freedom in the long history of the French colonisation of

18 Nicholas Mirzoeff, *White Sight: Visual Politics and Practices of Whiteness* (Cambridge, Mass: The MIT Press, 2023); Mirzoeff, *The Right to Look a Counterhistory of Visuality* (Durham: Duke University Press, 2011), p. 1.

19 Maeve McCusker, *Fictions of Whiteness: Imagining the Planter Caste in French Caribbean Novel* (Charlottesville: University of Virginia Press, 2021), p. 2.

20 I am drawing here upon *Colonial Lives across the British Empire: Imperial Careerings in the Long Nineteenth Century*, ed. by David Lambert and Alan Lester (Cambridge: Cambridge University Press, 2006).

21 See Walter Kusters and Marc Depaepe, 'The French Third Republic: Popular Education, Conceptions of Citizenship and the Flemish Immigrants', *Historical Studies in Education/Revue d'histoire de l'éducation*, (2011), 22–40; Emmanuelle Loubat, 'L'égalité dans la limite de l'utilité: Jules Ferry et la démocratisation de l'art (1879–1883)', *French Historical Studies*, 40.1 (2017), 71–94.

22 Patrick Daum, 'Vie et oeuvre', p. 199.

Martinique, yet abolition did not end the sourcing of labour from abroad to work in the profitable plantation factories.²³ Following the abolition of slavery, the *békés* needed new labourers to replace the formerly enslaved to keep up with production. After seeing the success of Britain's 'Great Experiment', France was inspired similarly to utilise their other colonial enclaves in India (Pondichery, Karikal and Calcutta) and recruit labourers to work on Caribbean plantations.²⁴ Mahadevi Ramakrishnan argues that most of the people who became indentured workers in the French Antilles were struggling to make ends meet in their rural communities in their homelands, and were pressured by European colonial powers.²⁵ In search of a more prosperous life, they signed a contract (lasting between three and five years) in their homelands, agreeing that they would travel to the faraway island to work on the plantations for a (very low) wage.²⁶

Martinique received primarily Southern Tamil-speaking Dravidians, while Guadeloupe received comparably more Indo-Aryans from Northern India.²⁷ Aisha Khan sums up the significance of the geographical origins of the labourers: 'The darker and more "African-like" Madrassis were often unfavourably contrasted with Indians from

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- 23 Silyane Larcher, *L'autre citoyen: l'idéal républicain et les Antilles après l'esclavage* (Paris: Armand Colin, 2014); Mickaëlla Périna, *Citoyenneté et sujétion aux Antilles francophones: Post-esclavage et aspiration démocratique* (Paris: L'Harmattan, 1997).
 - 24 Satyendra Peerthum and Kiran Chuttoo Jankee, 'The Indian Ocean and the History of Indenture: The Making of "new" Nationals and Nations', in *Cultural Heritage Management in Africa*, ed. by George Abungu and Webber Ndoro (London: Routledge, 2023), 140–58 (p. 140).
 - 25 Mahadevi Ramakrishnan, 'French, African, and Indian Cultural Narratives in Martinique: The Architecture of Shifting Social Hierarchies from 1848–1884', 27–36 (p. 28). *The International Journal of Interdisciplinary Cultural Studies*, 2 (2013), <https://www.proquest.com/scholarly-journals/french-african-indian-cultural-narratives/docview/2793203937/se-2>.
 - 26 Scholars have debated just how voluntary the decision to leave their homelands actually was for Indian labourers, given the widespread deployment of recruiters who used misleading advertising to attract a large number of people struggling in their homeland. See Aisha Khan, 'Caucasian, Coolie, Black, or White?: Color and Race in the Indo-Caribbean Diaspora', in *Shades of Difference*, ed. by Evelyn Nakano Glenn (Redwood City: Stanford University Press, 2020), pp. 95–113; Hugh Tinker, *A New System of Slavery: The Export of Indian Labour Overseas, 1830–1920* (London: Hansib, 1993); David Northrup, 'Indentured Indians in the French Antilles. Les immigrants indiens engagés aux Antilles françaises', *Outre-Mers. Revue d'histoire* (2000), 245–71 (pp. 250–54).
 - 27 Brinda J. Mehta, 'Indianités francophones: Kala Pani Narratives', *L'Esprit Créateur*, 2 (2010), 1–11 (p. 2).

Calcutta to the north who were, according to some, lighter in colour and more tractable. The simultaneous appellations of Aryan-although-not-necessarily-Caucasian, Caucasian-but-generally-not-white, and coolie-frequently-black, were variously used to characterise Indian and Indo-Caribbean peoples'.²⁸ The arrival of mostly South Indians in Martinique sheds significant light on our understanding of the racialisation of the indentured Indian labourers who found themselves in Martinique, who were seen as closer to Black with their darker skin, and thereby more closely associated with the racial marker of slavery. It is estimated that 76,000 Indians travelled to Guadeloupe and Martinique as part of indenture, which lasted until the late 1880s, coming to an end only after rising pressure from complaints about the severe maltreatment of indentured labourers in the French Antilles.²⁹ Here, we see how the gradations and nuances of colour directed and were a structural part of the experience of both the indentured labourers and the colonial administrators who all belonged to a system of colour that changed through geographies and across time, but continued to carry meaning and power that impacted the daily lived realities of being defined as coloured and asserting power over colour.

Towards the end of the system of indenture, though still before its termination, Fulconis dedicates two sheets of paper to the sole study of the Indo-Caribbean figures on the island. He captures the male and female Indo-Caribbean in detail; their appearance, what clothes they wear and what work they do. As Fulconis closely studies and categorises them, he further solidifies them as a group, one that is fixed and characterised by their continued sub-status in the Caribbean. This is particularly emphasised by his use of 'coolie' to name his drawings, which is representative of how the term came to be used increasingly in the nineteenth century to describe South Asian and Chinese indentured workers who immigrated to the Caribbean and the Americas, as well as the descendants of these labourers.³⁰ Moon-Ho Jung explains that the term 'coolie' was first used in the sixteenth century by Portuguese

28 Khan, 'Caucasian, Coolie, Black, or White?', p. 101.

29 Kate Marsh, "'Rights of the Individual'", *Indentured Labour and Indian Workers: The French Antilles and the Rhetoric of Slavery Post 1848*, *Slavery & Abolition*, 2 (2012), 221–31 (p. 221).

30 Moon-Ho Jung, *Coolies and Cane: Race, Labor, and Sugar in the Age of Emancipation* (Baltimore: Johns Hopkins University Press, 2006), p. 13.

sailors and merchants, and later also adopted by other European traders.³¹ It was transformed in the nineteenth century and used, as Fulconis does, as a derogatory term for the indentured labourers. In the Caribbean, as Lommarsh Roopnarine details, it came to mean ‘stupid, backward, uncivilised and resistant to change’.³² Gaiutra Bahadur further reiterates that ‘the c-word stung’, signalling the lowest position in the hierarchy of the sugar estate.³³ In Jung’s definition of the term, ‘coolies were never a people or a legal category. Rather, Coolies were a conglomeration of racial imaginings that emerged worldwide in the era of slave emancipation, a product of the imaginers rather than the imagined’.³⁴ He continues, noting that ‘evolving definitions and ultimate ambiguities—a slippery and disruptive creation between and beyond slavery and freedom, Black and white—rendered Coolies pivotal in the reconstruction of racial and national boundaries and hierarchies in the age of emancipation’.³⁵ Significantly, Jung further argues that the idea of coolies confused the boundary between slavery and freedom and the racial divide between ‘coloured’ and white.³⁶

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In the first drawing, *Femmes Indiennes Coolies, Riches et Pauvre* (1883) (Figure 8.1), Fulconis depicts four women, three in the upper half and one in the lower half of the pictorial space. On the left side of the top page, Fulconis draws a woman dressed in a red skirt and a white top with a matching red headscarf, and decorated in gold jewellery. The neckline of her white top extends below her shoulder, exposing one of her breasts to the viewer, clearly alluding to the erotic nature of the woman. With Fulconis’s depiction of the ‘coolie’ woman here, he speaks into a corpus of visual representations, particularly postcards, which display Indo-Caribbean women in their finest clothes and adorned with

31 *Ibid.*, p. 13.

32 *Ibid.*; Lommarsh Roopnarine, *The Indian Caribbean* (Jackson: University Press of Mississippi, 2018), p. 33.

33 Gaiutra Bahadur, *Coolie Woman: The Odyssey of Indenture* (London: Hurst & Co., 2016), p. xx.

34 Jung, *Coolies and Cane*, p. 5.

35 *Ibid.*

36 *Ibid.*

jewellery, posing in a photographic studio and charged with suggestive eroticism. Such images follow a visual strategy in which the object is seen outside their larger context and placed in front of the camera to exemplify their 'type' to an audience.³⁷ Fulconis's drawings and the widely circulated postcards are different in several ways, including their medium, audience, production process and aesthetics, yet I make the comparison here because they share a similar emphasis on the Indo-Caribbean woman, presenting her in stereotypical Indian clothing but decontextualising her from Caribbean society. The comparison allows me to position the work of Fulconis not as isolated in the archive, but as part of a network of images which he would also very likely have encountered as part of his daily life in the colony.

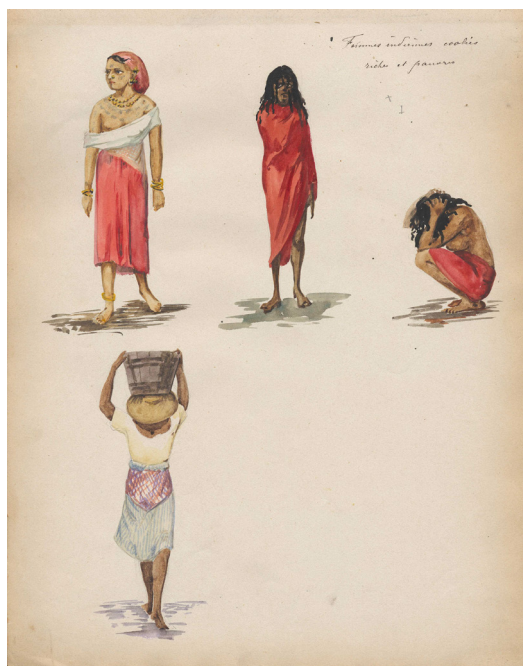


Fig. 8.1. Victor Pierre Fulconis, *Femmes Indiennes Coolies, Riches et Pauvre*, 1883, ©Collectivité Territoriale de Martinique – Archives.

37 Joy Mahabir, 'Alternative Texts: Indo-Caribbean Women's Jewellery', in *Caribbean Vistas: Critiques of Caribbean Arts and Cultures*, 8 (2009), <https://caribbeanvistas.wordpress.com/wp-content/uploads/2014/03/mahabiralalternativejewelry1.pdf>.

One example of such postcards of the Indo-Caribbean female is *Type et costume de femme indienne* (c.1890–1830).³⁸ This displays a young girl posing in front of the camera in a studio. At the top is the word ‘Martinique’, specifying to the receiver that this postcard and its motif are from the island. Scholars have pointed out how such postcards are characterised by an emphasis on the jewellery of Indo-Caribbean women, with Joy Mahabir arguing that this ‘aesthetic of excess’ was used to display the wealth of the Indo-Caribbean population and hence to confirm that the people did not work on plantations and live in poverty as did the former enslaved, but rather thrived and took advantage of the opportunities available at a resource-rich colony, underscoring their—and the Caribbean’s—exotic foreignness.³⁹ Mahabir understands the women’s jewellery as an ‘alternative text’, because this jewellery, according to her, was a way for the indentured women to bank their earnings, melting their silver shillings into pieces of jewellery and later selling this to pay for education or purchase land.⁴⁰

By positioning Fulconis’s vibrantly coloured drawings in dialogue with the black-and-white postcards of the same subject matter, we can see how the drawings were part of a visual language which represented the Indo-Caribbean population through the figure of the woman. Whereas the postcards generally focus on the material wealth of the women, Fulconis also studies the Indo-Caribbean male, and records both the wealth and poverty of the population, perhaps suggesting a more nuanced view of the people than the one that circulated via the postcards. This is exemplified in the drawing (Figure 8.1), where he also depicts a woman dressed in a long red cloth with a slit on the side. Her long black hair falls in front of her eyes as she looks at the viewer with a grim, downcast facial expression. Gone is the jewellery and the suggestive eroticism; here Fulconis shows the woman as outwardly miserable. He continues to draw sadness in the Indo-Caribbean in the next woman, who is crouched down to her knees and covers her head in her hands, perhaps in distress.

Fulconis classifies the people as ‘coolie’, not only in the explicit

38 See Musée du Quai Branly–Jacques Chirac, <https://collections.quaibranly.fr/inventory/no.PP0153215> and PP0153216.

39 Joy Mahabir, ‘Alternative Texts’.

40 *Ibid.*

naming of the drawings but also in the way he draws them: isolated individual studies with no context, using their economic status as an additional criterion for classification. He constructs the drawings with an anthropological sensibility that captures Broca and his colleagues' repetitive recordings and categorisations of non-white people. However, whilst Broca understands colour as the primary categorising principle, Fulconis also categorises the 'coolies' through their clothing (for example, their bangles and their saris) and divides the group into the rich and the poor, adding more to his visual representation than what appears in Broca's works. In his sketches, Fulconis reflects, sometimes with uncertainty, on how the Indo-Caribbean population is settling, successfully and unsuccessfully, as seen through the eyes of a white male. Although the drawings are not able to tell us much about the actual experience of being an indentured labourer or being a descendant of one, they are examples of what a drawing teacher paid attention to while encountering the Indo-Caribbean.

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Fulconis uses the same visual language and methods in the second drawing, *Indiens Coolies* (1883) (Figure 8.2): a study of six Indo-Caribbean men. Zooming in, we see how Fulconis draws each of the men with an attentive eye for the details of the 'types' of male coolie, using clothing, occupation and skin colour as legible markers of identity. We are quickly reminded of Broca's anthropological method in Fulconis's intent observation and depiction of the individual in isolation from any context. His insistence on capturing the 'coolie' is further accentuated when looking even closer: we notice that Fulconis repeatedly sketches out the shapes of the men with pencil before committing to the final version, only then incorporating details and colours. In the upper plane of the drawing, Fulconis makes a visual comparison between affluent and less privileged classes within the Indo-Caribbean community, which he articulates with particular attention to their attire, mirroring Danielle Skeehan and Steeve O. Buckridge's positioning of clothing as a 'text' and carrier of meaning in Caribbean societies.⁴¹ On the far left, Fulconis

41 Danielle Skeehan, *The Fabric of Empire: Material and Literary Cultures of the Global Atlantic, 1650–1850* (Maryland, Baltimore: Johns Hopkins University Press, 2020);

depicts a man with a dark complexion, attired in a western-style suit jacket with a ruffled turquoise cravat, complemented by cummerbund and rolled-up trousers. In one hand, he holds an umbrella—which is another sign of affluence, with its ability to protect him from natural elements such as the scorching sun or a strong downpour. In the other arm, he cradles a baby, which again speaks to the prosperity of the man and the successful reproduction of another generation. His refined, elegant attire assumes the success and social status of the man, yet this is complicated when we notice that the man is barefoot. Unprotected and closer to the ground means closer to nature and the ‘primitive’. It suggests to us that Fulconis is struggling here to make sense of this figure, who is affluent but not quite, and wears familiar clothing that is not actually the same as western attire. Next to this figure, Fulconis draws two other figures as legibly poorer. One man sits in a crouched position in profile with a bowl in front of him, wearing only a red cloth around his lower half. To the right side of him, another male figure, similarly dressed only in a red cloth around his buttocks and otherwise naked, carries a long knife in one hand and a long piece of bamboo in the other, indicating that he is walking back from the plantation field. The man below him in the drawing carries a wide load of large grass, which likewise places the figure in connection to the plantation and points to the fertility of the ground and the continued profit to be made from the natural world in Martinique, even after the abolition of slavery. Across the figures, we see how Fulconis uses colour to capture the nuances of the appearance of the Indo-Caribbean, with a particular interest in their clothing. From his writings, collected by Patrick Daum (who wrote his 1986 doctoral thesis on Fulconis and his father), we know that Fulconis imported the drawing materials he needed for his work at the schools. As such, the colours he used to make these drawings were also from continental Europe, suggesting further to us how colour moved—alongside other goods such as textiles—across the Atlantic and was then utilised to capture the subjects of the colonies.⁴²

The close interweaving of colour, textiles and the Indo-Caribbean experience is part of a long thread of connection between colonies

Steeve O. Buckridge, *Language of Dress: Resistance and Accommodation in Jamaica, 1760–1890* (Kingston, Jamaica: University of the West Indies Press, 2004).

42 Daum, ‘Vie et œuvre’, p. 194.

that precedes the physical presence of Indian bodies in the Caribbean, materialised most explicitly through madras cloth. One of the major commodities exported from India, it travelled across large distances to Europe, the Middle East, Africa and the Caribbean, becoming a global product which initially adapted its design from Scottish tartan.⁴³ As its name suggests, madras is from its namesake city (known today as Chennai) in India: one of the most successful ports of the British Empire due to its large export of goods. This colourful, checked fabric made its way to the Antilles in the seventeenth century and became an integral part of the island's fashions.⁴⁴ Post-enslavement, formerly enslaved women began to wear the *douillette*, a five-piece dress reserved only for free women before abolition, and used the colourful madras fabric for their headdress, rather than continuing with the white headdress required of the enslaved.⁴⁵ As Maria Thomas argues, 'the madras cloth is an icon that is dyed in the memories of racial injustice and woven with the shared stories and memories of distant colonised nations, meant to be a marker of subjugation, yet re-casted in the spirit of emancipation and pride'.⁴⁶ Recalling Broca's emphasis on skin colour as a reliable source in the construction of meaning, a textile such as madras, entangled in racial histories of displacement and belonging, is another easily legible sign of difference aiding anthropology's call for identification. As already noted, Fulconis puts emphasis on materiality and carefully captures the textiles of his subjects, using the fabrics as a way to distinguish the figures' different financial statuses, as we see across the drawing—notice, for example, the bright turquoise butterfly, the deep red fabric and the blue checkered shirt of the men.

In the lower half of the drawing, Fulconis renders a man who wears a light yellow wrap cloth down to his knees, a white shirt and a red headscarf. Looking straight at the viewer, he carries a long knife and holds his free hand up to his eye. In contrast to the other men, whose

43 Hélène Zamor, 'Indian heritage in the French Creole-speaking Caribbean: A reference to the Madras Material', *International Journal of Humanities and Social Science*, 4.5 (2014), 155–61 (p. 155); Thomas, 'Chequered Intermingling', p. 61.

44 *Ibid.*, p. 155.

45 *Ibid.*, p. 156; Maria Thomas, 'Chequered Intermingling and Contrasts: Exploring the Madras Cloth as an Icon of Hybridity', *VIMALA COLLEGE (AUTONOMOUS)* (2023), p. 64.

46 Thomas, 'Chequered Intermingling', p. 61.

eyes are blacked out or averted, Fulconis draws this man's eyes in more detail, rendering the sclera and adding the hand almost as a binocular. The figure here is clearly looking back at Fulconis and at the viewer, and the hand gesture suggests deliberate attention to the eye and the act of looking back. Scholars of empire often speak of the potential ability to re-read or re-make the agency of the people depicted by colonial makers by redirecting the looking, with Mimi Sheller coining the term of 'an embodied encounter', which she describes as a space for contesting the gaze, deflecting the gaze, returning the gaze, appropriating the gaze and destabilising the power of the gaze.⁴⁷ We see this occurring in Fulconis's drawing here, for whilst he attempts to capture this man in one sketch, he simultaneously, and perhaps rather confusingly, points to the possible humanity of the subject, which reflects back on Fulconis as a maker.



Fig. 8.2. Victor Pierre Fulconis, *Indiens Coolie*, 1883, ©Collectivité Territoriale de Martinique – Archives.

47 Mimi Sheller, *Citizenship from Below: Erotic Agency and Caribbean Freedom* (Durham: Duke University Press, 2012), pp. 211–14.

Fulconis's drawing is tied to his ability to move around the empire in a way that is referred to by David Lambert and Alan Lester as 'imperial careerering', with 'career' here not only denoting a professional path, but also a course through life characterised by movement and periods of dwelling in colonised places.⁴⁸ Whilst Fulconis was a visual artist and an educator who came to Martinique specifically to take up a teaching position and make a life settling on the island, the writer Lafcadio Hearn (1850–1904) was a traveller who moved around the globe producing his writings, staying in Saint Pierre between 1887 and 1889.⁴⁹ Despite the differences in their careers, the time they spent in and their intentions in coming to Martinique, both Fulconis and Hearn were part of and connected to wider colonial networks of similar travelling men experiencing arrivals and departures from various places, now to be found in the records they created.

Both Fulconis and Hearn observe and record being looked back at by Indo-Caribbeans, Fulconis through drawing and Hearn through writing. Hearn wrote of his experiences in short sketches, which were published in the American magazine *Harper's Bazaar*, and later all collected in the book *Two Years in the French West Indies* (1890).⁵⁰ In book form, they provide a unique written account of the perspective of an affluent traveller who articulates the French colony through the tropes of eroticism and exoticism. His in-person, direct experiences and observations are what furnish his accounts with authority and weight, reminding us of Broca's emphasis on the superior virtues of the embodied experience on the ground. In one particularly interesting section, Hearn writes of being stared at by individuals he terms 'the Hindoos: Coolies', describing an encounter he found particularly unsettling:

Men squatting, with hands clasped over their black knees, are watching us from under their white turbans—very steadily, with a slight scowl. All these Indian faces have the same set, stern expression, the same knitting of the brows; and the keen gaze is not altogether pleasant. It borders

48 David Lambert and Alan Lester, 'Introduction: Imperial spaces, imperial subjects', in *Colonial Lives across the British Empire: Imperial Careerering in the Long Nineteenth Century*, pp. 1–31 (p. 22).

49 Valérie Loichot, 'Cooking Creoleness: Lafcadio Hearn in New Orleans and Martinique', *Journal of French and Francophone Philosophy*, 20.1 (2012), (p. 2).

50 Lafcadio Hearn, *Two Years in the French West Indies* (New York: Harper & brothers, 1890), <https://archive.org/details/twoyearsinfrench00hearrich>.

upon hostility; it is the look of measurement—measurement physical and moral. In the mighty swarming of India these have learned the full meaning and force of life's law as we Occidentals rarely learn it. Under the dark fixed frown the eye glitters like a serpent's.⁵¹

What immediately jumps out about this assessment is how intimately connected the Indian and the animal are in Hearn's imagination, most obviously through the malicious connotations of the serpent. He further utilises the verb 'swarming' as a racial marker that asserts the Indo-Caribbean as insect-like and conjures, through one word, an implicit but easily recognisable set of images defining their character: a dense and overcrowded group that moves not as individuals but as a unit in chaotic and perhaps even destructive fashion. Like locusts, ants, termites or wasps, they are an unhygienic and highly mobile—and thus dangerous and invasive—mass that corrupts and threatens the individual observer, and more broadly pollutes the island's social landscape.

Whilst Hearn is usually the observer and the one possessing what Mary Louise Pratt names 'imperial eyes' that look at and assume authority over land and people, here the 'serpent eyes' of those usually gazed at are staring back, unsettling the certainty of his vision, which evokes a discomfort within him.⁵² Both Fulconis and Hearn capture a moment in which their position as (almost) invisible knowledge-gatherers is threatened by the very existence of the figure of the 'other' as one that is capable of looking and making assumptions. Here, the eyes see and know, piercing and threatening, challenging the empire's reliance upon the idea that the colonised will not look back. These makers notice and comment upon the eyes, drawing out their shades and character, as the site of an embodied resistance. Recalling that Fulconis makes a clear distinction between one man whose eyes are fully depicted, and the other men he draws whose eyes are illegible, unformed or obscured, we see that Fulconis, just like Hearn, identifies the ability to look or not look back at them as a significant concern in trying to represent the 'coolie'. Hearn identifies that the potential threat of being looked back at and recognised by a 'coolie' stems from the unique knowledge they possess coming from another land and having been brought to

51 *Ibid.*, p. 76.

52 Mary Louise Pratt, *Imperial Eyes: Travel Writing and Transculturation* (London and New York: Routledge, 2008).

the Caribbean, which gives them an ability to discern the nature of the power-knowledge nexus that the white observer assumes (and requires) the colonised body to be blind to.

The lucid vision of Indo-Caribbean people combined with their heterogeneity as a group challenges Broca's easy anthropological categorisation, which Fulconis's drawings and Hearn's account on the surface seek, but ultimately fail, to confirm. We saw at the beginning of this chapter how Broca was keen to measure and assess the unknown 'other', for example by cutting off a piece of hair, assuming no resistance from the person. Here, the act of measuring is turned around: it is Hearn who experiences their gaze as 'measurement physical and moral', in a manner that is 'altogether not pleasant'.⁵³ Significantly, Hearn's presumption that being looked at must equate to being measured, assessed and appraised in a hostile manner highlights a broader claim that looking, measuring and sense-making were fused in the colonial mindset and mission. The very rich and methodically collected and recorded details that Broca advocates for as good ethnographic practice are, ironically, where we can find the limits of anthropology as a repository of objective information, and where we can read the ever-present resistance of the individual even within the colonial archive.

As such, it is in the work of a drawing teacher such as Fulconis that we see how the act of drawing was a battleground of meaning-making, where colonial eyes cross through and past one another, seeing and unseeing. The drawings, then, are not only about identifying different 'coolies' across classes and skin colours—whether that is by their bare feet or their 'stern expression'—but also about the artist, capturing a moment of instability in his artistic encounter, where the drawing's anthropological sensibility becomes a vehicle in which we can find the competing gazes clashing in their attempts to speak through the drawing. The invisibility of whiteness and the visibility of non-whiteness is a presumed structure that underpins and defines Fulconis's artistic work. In fact, when we interrogate his drawings, we see that the unintentional glimpses left behind of what fills the chasm between the white and non-white binary reveal colour—as a racial marker and as a tool of categorisation—to be insufficient for effectively capturing the complex and relational racial structure of Martinican society.

53 Hearn, *Two Years*, p. 72.

Conclusion

Moments of colour run through this chapter, from Broca's and Piper's palettes to the blue ruffled scarf of the finely dressed man and the silver jewellery of the women. We have seen how in the increasingly global economy of the tightly knit French world, colour flowed across oceans in the material objects of textiles and pigments, and in ideas about how the world should be structured along coloured lines. While Fulconis used the infrastructure of empire and worked in its service, there are also moments of ambiguity in his work, in the stare of the man or the visible discontent of the woman, both questioning the certainty that empire depended on. Fulconis used drawing as a medium to not only practise his craft as an artist and teacher, but also to make sense of his surroundings in the post-abolition world. As scholars such as Silyane Larcher and Mickâella Périna have shown, 1848 was not the end point of a racially defined society in Martinique (nor, more broadly, in the French Empire) but rather the drawing board upon which to grapple with different practices of racialisation, keeping colour concerns at the front and centre.⁵⁴ Indeed, the drawings in this chapter are a rare source, depicting the Indo-Caribbean population on Martinique *in colour*, in a manner that contributes to our understanding of the dual use of colour as a visual and material form of expression to capture the characteristics of race. Fulconis's visual language, isolating the people on the page without any context, assumes an anthropological authority and knowledge. But, when we look more closely, we see a creator who is struggling with his own uncertainty about who and what he sees and is, in turn, questioning who he is within a complex network of people who refuse his fixed colour categorisation and homogenisation, challenging colour's organising power by daring to look back.

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54 Larcher. *L'autre citoyen*; Périna, *Citoyenneté et sujétion*.

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PART IV

9. Annotating Syme: Nineteenth-Century Marks and Marginalia in *Werner's Nomenclature of Colours* (1814/1821)¹

Joyce Dixon

Introduction

From the late spring of 1814, one hundred copies of a new colour publication entered the marketplace, printed and published in Edinburgh.² Each copy was enclosed in the publisher's binding of brown paper boards, with a rectangular label affixed to its cover bearing the book's title:

WERNER'S
NOMENCLATURE OF COLOURS
ADAPTED TO
*Zoology, Botany, Chemistry, Mineralogy, Anatomy,
and the Arts,*
By P. SYME.³

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- 1 This research is the result of a Doctoral Training Partnership Studentship at the University of Edinburgh, funded by the Arts and Humanities Research Council (UKRI funding reference AH/L503915/1). My thanks go to all of the librarians, archivists and private collectors whose generous assistance made this chapter possible. I am also grateful to Dr Giulia Simonini for her guidance; to my supervisors Professor Vicky Coltman and Professor Fiona McLachlan for their continued support; and to Dr Alexandra Loske for her expertise.
 - 2 Edinburgh, National Library of Scotland, Papers of William Blackwood & Sons, MS.30002, folio 132.
 - 3 Patrick Syme, *Werner's Nomenclature of Colours: With Additions, Arranged so as to*

Outwardly unassuming, the focal feature of the book's interior was a series of colour charts. Comprising 108 colours in total, these were arranged into tabularised selections of 'Whites', 'Greys', 'Blacks', 'Blues', 'Purples', 'Greens', 'Yellows', 'Orange', 'Reds' and 'Browns'. For each hue, a pasted-in swatch accompanied a numerical and binomial designation, along with referents from the animal, vegetable and mineral kingdoms. The blues, for example (as seen in Figure 9.1), included 'Scotch Blue', 'Prussian Blue', 'Indigo Blue' and 'China Blue'—the latter (no. 27) was associated with the iridescent weevil 'Rhynchites Nitens', the 'Back Parts of the Gentian Flower' and the deep-toned mineral azurite ('Blue Copper Ore from Chessy'). Compiled by the artist Patrick Syme (1774–1845), *Werner's Nomenclature* was intended to provide 'a nomenclature of colours, with proper coloured examples of the different tints, as a general standard to refer to in the description of any object'.⁴ The book was based on a system for chromatic identification proposed by the influential Saxon mineralogist Abraham Gottlob Werner (1749–1817), initially published in 1774.

A second edition of *Werner's Nomenclature* was published in 1821, extending Syme's chromatic offering to 110 hues.⁵ The appearance of this second edition also extended the recorded number of circulated copies (of both editions) to 200.⁶ Those that have survived are the subject of this chapter, which is the result of a descriptive census of thirty-five copies of the first edition and forty-six of the second. These items are located in sixty private, public and institutional libraries across three continents.⁷ In the following discussion, I interrogate the object-histories

Render It Highly Useful to the Arts and Sciences, Particularly Zoology, Botany, Chemistry, Mineralogy, and Morbid Anatomy; Annexed to Which Are Examples Selected from Well-Known Objects in the Animal, Vegetable, and Mineral Kingdoms (Edinburgh: printed by James Ballantyne and Co. for William Blackwood, South Bridge Street, Edinburgh; and John Murray, Albermarle Street, and Robert Baldwin, Paternoster Row, London, 1814), <http://hdl.handle.net/2027/hvd.fl3k7l>.

4 *Ibid.*, p. 1.

5 Patrick Syme, *Werner's Nomenclature of Colours: With Additions, Arranged so as to Render It Highly Useful to the Arts and Sciences, Particularly Zoology, Botany, Chemistry, Mineralogy, and Morbid Anatomy; Annexed to Which Are Examples Selected from Well-Known Objects in the Animal, Vegetable, and Mineral Kingdoms* (Edinburgh: printed for William Blackwood, Edinburgh; and T. Cadell, Strand, London, 1821), https://ia601707.us.archive.org/27/items/gri_c00033125012743312/gri_c00033125012743312.pdf.

6 Edinburgh, National Library of Scotland, Papers of William Blackwood & Sons, MS.30002, folio 133.

7 For a descriptive census of surviving copies, see Joyce Dixon, "'Mr Syme's Useful Little Work": The Making of *Werner's Nomenclature of Colours* (1814/1821) in Early

of these individual 'book-copies', approaching *Werner's Nomenclature* as a diaspora of distinct artefacts.⁸ In doing so, I adhere to book historian Adrian Johns's proposition that 'the story of a book evidently does not end with its creation': a printed book, Johns contends, is at once a 'starting point' for various social and intellectual practices, and a 'nexus' for complex networks of individuals, objects and ideas.⁹

Focusing my analysis on those copies of particular material or historical interest, I explore the capacity of Patrick Syme's book to operate simultaneously as a 'starting point' and a 'nexus' for various modes of chromatic enquiry. My source material is the physical remnants of nineteenth-century consultation, appearing as marks and marginalia, signatures, dedications and bookplates, as well as material additions in the form of painted augmentations, fabric swatches and biological matter. Beginning in the first section of this chapter with the local circulation of Syme's book, I explore the relevance of *Werner's Nomenclature* for Edinburgh's scientific, artistic and paedagogical activities in the early to mid-nineteenth century. In the second section, I expand this geographical scope to discuss the reception of *Werner's Nomenclature* among naturalists on both sides of the Atlantic, with a particular focus on the annotative practices of the American naturalist Samuel Stehman Haldeman (1812–1880). The third and fourth sections explore the popularity of Syme's book as a canonical work on colour for nineteenth-century aesthetics and design, and for the systematic arrangement of colour (chromotaxonomy). These four sections constitute a material history of reading and using—as well as extra-illustrating, collaging and graffitiing—Syme's book in the nineteenth-century English-speaking world, revealing the diverse and diffuse applicability of an illustrated nomenclature of colours. Moving beyond purely epistemic considerations of Syme's charts as a 'system' or 'nomenclature', I consider instead the embodied and highly sensuous engagement with colour that was facilitated by its tangible presence as a material book.

Nineteenth-Century Edinburgh' (unpublished doctoral thesis, University of Edinburgh, 2024), pp. 342–52.

8 The term 'book-copy' is commonly used in book-historical discourse. See J.A. Dane, *Blind Impressions: Methods and Mythologies in Book History* (Pennsylvania: University of Pennsylvania Press, 2013), <https://doi.org/10.9783/9780812208696>.

9 Adrian Johns, *The Nature of the Book: Print and Knowledge in the Making* (Chicago: University of Chicago Press, 1998), p. 3.

Names of
orig. ed. of
Werner.

B L U E S					
No.	Names	Colours	ANIMAL	VEGETABLE	MINERAL
24	Scotch Blue		Throat of Blue Titmouse.	Stamina of Single Purple Anemone.	Blue Copper Ore.
25	Prussian Blue.		Beauty Spot on Wing of Mallard Drake.	Stamina of Bluish Purple Anemone.	Blue Copper Ore
26	Indigo Blue				Blue Copper Ore.
27	China Blue		Rhynchites Nilens	Back Parts of Gentian Flower.	Blue Copper Ore from Chessy.
28	Azure Blue.		Breast of Emerald crested Manakin	Grape Hyacinth. Gentian.	Blue Copper Ore.
29	Ultra marine Blue.		Upper Side of the Wings of small blue Heath Butterfly.	Borrage.	Azure Stone or Lapis Lazuli.
30	Flax- flower Blue.		Light Parts of the Margin of the Wings of Devil's Butterfly.	Flax flower.	Blue Copper Ore
31	Berlin Blue.		Wing Feathers of Jay.	Hepatica.	Blue Sapphire.
32	Verditer Blue				Lenticular Ore.
33	Greenish Blue			Great Fennel Flower.	Turquoise. Flour Spar.
34	Grayish Blue.		Back of blue Titmouse	Small Fennel Flower.	Iron Earth.

Shy Blue.

Small Blue.

Fig. 9.1. Blue chart from Robert Ridgway's copy of Werner's *Nomenclature of Colours* (1821) showing annotations in pencil and crayon and splatters of paint. Smithsonian Institution (ND1285 .W49 1821 c.2), courtesy of Smithsonian Libraries and Archives.

Werner's Nomenclature in Edinburgh

Even the closed cover of a book-copy reveals something of its singular biography. Of those surveyed here, some are preserved in their fragile publisher's bindings, whose repurposed materials—Scottish newspapers—are occasionally visible beneath fraying layers.¹⁰ Others exhibit nineteenth-century bindings of practical leather, worn to a sheen through repeated handling.¹¹ Some have been bound in decorative marbled paper marked with armorial stamps, situating their spatial presence on the shelves of individual libraries and indicating each copy's geographical dispersal from its printing in Edinburgh.

This circulation, in many instances, appears to have had highly localised beginnings. Among the surveyed copies, eight have remained in Edinburgh, while others (now disseminated further afield) exhibit stamps, bookplates and inscriptions evidencing their initial residence in the city's societal and institutional libraries. For example, copies in Wisconsin and Illinois both contain the inked 'ex libris' of the Royal Medical Society of Edinburgh (est.1737), while the Advocates Library (est.1682), the Society of Writers to the Signet (est.1594) and the University of Edinburgh all appear to have acquired copies soon after publication.¹²

There is also evidence of private ownership among these Edinburgh-connected copies. An 1821 edition held by the Royal College of Surgeons of Edinburgh contains the bookplate and signature of William Walker (1813–1885), president of the college from 1871 to 1873.¹³ Walker acquired his copy of *Werner's Nomenclature* in 1842, and at some point had it bound with a selection of medical pamphlets on topics such as the 'Eradication of Inverted Eyelashes'.¹⁴ The provenance of this copy reflects the widespread occurrence of Syme's terms in Scottish medical and scientific journals from the late 1810s onwards. Similarly, Syme's

10 For example, Cambridge, Cambridge University Library, S360.c.82.1 (1821).

11 Pennsylvania, Swarthmore College, McCabe Library, ND1510 .W5 (1814).

12 Wisconsin, University of Wisconsin-Madison, CA 3479 (1814); Illinois, University of Illinois at Urbana Champaign, 752 W49W (1814); Edinburgh, National Library of Scotland, Cq.5.18 (1814); Edinburgh, National Library of Scotland, NC.247.c.33 (1814); Edinburgh, University of Edinburgh Library, L.26.30 (1821).

13 RCSEd (1821).

14 James Hunter, *On the Eradication of Inverted Eyelashes and on the Preparation of Fine Points of Caustics for Ophthalmic and Other Purposes* (Edinburgh: c.1840).

colour charts had ocular relevance for the English physician George Harvey (d.1834), who made practical use of them as a measure for the 'anomalous' colour vision of his patients: by candlelight, one subject 'mistook a thread of pink silk for grey, and, under the same circumstances, confounded flax-flower blue (No. 29. Werner's Nomenclature of Colours by Syme) with the same colour'.¹⁵

While such examples attest to the book's applicability to the field of 'Morbid Anatomy', others relate to another facet of Edinburgh's scientific and paedagogical context in the early to mid-nineteenth century. Present in multiple copies are notes and annotations relating to geological and mineralogical subjects. For example, an anonymous early consultant has made use of the ready-made scrap paper of one copy's inside cover to list the various categories of the 'Lustre' ('Splendent./Shining./Glistening/Glimmering'), 'Fracture' ('Splintery/Conchoidal/[...] Even/Uneven/Earthy/Hackly/Slaty') and 'Transparency' of minerals.¹⁶ This descriptive lexis reflects the teachings of Abraham Gottlob Werner, on whose original colour nomenclature *Werner's Nomenclature* was based.¹⁷ Appearing originally in Werner's 1774 mineralogical manual *Von den äußerlichen Kennzeichen der Fossilien* ('On the External Characters of Fossils'), the vocabulary transcribed into this book-copy belongs to a larger lexicon of descriptive terms for mineralogical matter.¹⁸ Along with technical terms for the cohesion, unctuousity, coldness, weight, smell and taste of 'fossils' (minerals), Werner's 'external characters' included a descriptive list of the most commonly occurring mineralogical hues.

In Edinburgh, Werner's theories and methods were encountered most often through the pedagogy and publications of Robert Jameson (1774–1854), Regius Professor of Natural History at the university from 1804

15 George Harvey, 'On an Anomalous Case of Vision with Regard to Colours', *Transactions of the Royal Society of Edinburgh*, 10 (1826), 253–62 (p. 254). For more on the reception of *Werner's Nomenclature* in medicine, see André Karliczek, 'One for All? *Werner's Nomenclature of Colours* as General Standard of Colour and Its Particular Use in Medicine', in *Nature's Palette: A Colour Reference System from the Natural World*, ed. by Patrick Baty (London: Thames & Hudson, 2021), pp. 224–35, <https://doi.org/10.1515/9780691222714-011>.

16 Edinburgh, University of Edinburgh Library, L.26.30 (1821).

17 Abraham Gottlob Werner, *Von den äusserlichen Kennzeichen der Fossilien* (Leipzig: Crusius, 1774), <https://doi.org/10.11588/diglit.2529>.

18 *Ibid.*

to 1854. As a former student of Werner's, Jameson was an enthusiastic proponent of the so-called 'Wernerian' school of geological thought.¹⁹ It was he who encouraged the local artist Patrick Syme to compile an illustrated edition of Werner's chromatic vocabulary, supplying Syme with specimens from his collection and sharing his adaptive translation of Werner's 1774 treatise:

This he [Syme] executed with his usual skill and accuracy; adding, at the same time, to the series several other colours, which he has distinguished by appropriate names, and arranged along with those in the Wernerian System. The whole have [sic] been published in a series of tables, in a treatise which ought to be in the hands of every mineralogist, and indeed in the possession of naturalists of every description.²⁰

As Jameson recounts here, Syme extended the scale and scope of Werner's taxonomy, expanding and tweaking the selection of colours and adding botanical and zoological examples as well as, crucially, painted samples.

Further annotations among copies attest to the purposefully Wernerian application of Syme's book. This includes marginal additions of Werner's original colour names (as per Jameson's translation): 'Sky' and 'Smalt' beside Syme's 'Greenish' and 'Greyish' blues; 'Lav. Blue' beside 'Lavender Purple'; 'cherry' beside 'Brownish Purple Red'.²¹ One annotator is explicit in their cross-comparison of Syme's and Werner's colours, noting on the chart of whites that '[t]he letters W = Werner's Characteristic Colour/and S = Syme's'.²² This annotative pattern evidences the repeat use of *Werner's Nomenclature* to furnish this cohort of (largely anonymous) readers with a visual guide to Wernerian terminology. These individuals were likely

19 For a detailed biographical summary, see Jessie M. Sweet's introduction to *The Wernerian Theory of the Neptunian Origin of Rocks* (New York: Hafner Press, 1976), pp. xii–xxiv. See also Dixon, "Mr Syme's Useful Little Work", pp. 103–39.

20 Robert Jameson, *A Treatise on the External, Chemical and Physical Characters of Minerals* (Edinburgh: A. Constable, 1816), <https://hdl.handle.net/2027/wu.89119132157>, p. 86.

21 Edinburgh, National Library of Scotland, Cq.5.18 (1814).

22 Edinburgh, National Library of Scotland, NC.247.c.33 (1814). The pencil addition of 'Compact Felspar / Pentland Hills' to 'Deep Orange-coloured Brown' cements the mineralogical interests of its annotator. Other copies with Syme's colours mapped to Werner's include Washington DC, Smithsonian Institution, ND1285 .W49 1821 c.2 (1821).

students of Jameson's natural history classes; among them could also have been members of the Wernerian Natural History Society, founded by Jameson in 1808. In fact, one of the earliest book-copies to have been distributed was donated to the Wernerian Society in April 1814.²³ It bears the inscription 'To the Wernerian Society', written in Syme's hand. Syme was 'Painter of objects' to the Society, and would have found an ideal readership in its membership of amateur and professional naturalists.²⁴

Now housed in the library of the Royal Scottish Academy (RSA), this particular copy possesses a dual resonance for the cultural history of the Scottish capital. On its front flyleaf is a second dedication, this one penned by the painter William Fettes Douglas (1822–1891), RSA president from 1882 to 1891. Fettes's inscription endows this copy with a specific symbolic significance: "'The first general meeting of the Scottish Academy was held on 27 May 1826. Patrick Syme in the chair.'/The accompanying little volume I picked up at a book stall—I hand it to the Librarian of the Academy as a relic of its former chairman.' As this inscription intimates, Syme was among the founding members of what was initially known as the Scottish Academy of Painting, Sculpture, and Architecture, whose early members and presidents included Henry Raeburn (1756–1823), John Watson Gordon (1788–1864) and George Watson (1767–1837).²⁵

Syme's co-founding of the RSA marked the culmination of an artistic career spanning two decades, which saw him ascend to a principal position among Scotland's artistic (as well as scientific) milieu. Syme was also a prolific drawing teacher, honing the pictorial abilities of medical students, society 'Ladies' and celebrated naturalists alike.²⁶

23 Edinburgh, Royal Scottish Academy (1821). Syme's donation was recorded in the minutes of the society; see Edinburgh, University of Edinburgh Library, Records of the Wernerian Natural History Society, Coll-206 'Minutes Volume 1, 12 January 1808–01 May 1830', p. 67.

24 Syme was appointed on 9 December 1809, as documented in *Ibid.*, p. 33.

25 See Esme Gordon, *The Making of the Royal Scottish Academy* (Edinburgh: Royal Scottish Academy, 1976).

26 An advert from 1804 announces the opening of Syme's 'Summer Class for Botanical Drawing, for Ladies only, on Monday the 9th day of July, at 10 o'clock': *The Edinburgh Evening Courant* (Edinburgh: printed by Mr. David Ramsay and company, 5 July 1804).

While Syme authored two other publications, *Werner's Nomenclature* was acknowledged by his contemporaries to be his most influential work.²⁷ In the following sections I explore this influence, beyond Edinburgh and across numerous disciplines, using the evidence contained in its corpus of book-copies.

Evolutionary Hues

While the popularity of *Werner's Nomenclature* in Edinburgh is well evidenced in the collected marginalia, the book's nineteenth-century readership was by no means restricted to the Scottish capital, nor to any single branch of scientific enquiry. Among its bibliographical diaspora are the signatures of the English naturalist Major General Thomas Hardwicke (1756–1835) and Dublin physician J. W. Moore (b.1845); bookplates include those of the American chemist Edgar Fahs Smith (1854–1928), French physicist Émile Verdet (1824–1866), Italian agriculturist Pietro Petrucci (1777–1863), chemist and botanist Charles Daubeny (1795–1867) and the naturalist Charles Darwin (1809–1882).²⁸

While few of these individuals left physical evidence of interaction with their respective copies, Darwin's 1821 edition of *Werner's Nomenclature* is one noteworthy exception. Now held in Cambridge University Library, this item retains the human and environmental traces of its 1831–1836 passage on board *HMS Beagle*, as regular resident of Darwin's pocket and palm.²⁹ Some of these pages

27 For example, the scientist David Brewster (1781–1868) wrote that 'Mr Syme is well known to Naturalists by his excellent work on Colours'. Kingcausie, Irvine Fortescue Family Archive (NRAS801), Printed pamphlet 'Testimonials in Favour of Mr Patrick Syme: Respectfully Submitted to the Patrons of the Dollar Academy' (1829), p. 17.

28 London, British Library, 1136.i.6 (1814); Massachusetts, Smith College, Neilson Library, 535.6 W495w 1814 (1814); Pennsylvania, University of Pennsylvania Libraries, 667.2 W498 (1821); École normale supérieure, Bibliothèque de Lettres et sciences humaines, S P p 1073 8° (1814); Pesaro, Biblioteca e Musei Oliveriani, OLA 35438 (1814); Oxford, Oxford University, Magdalen College Library, 90.J. 7 (2) (1814); Cambridge, Cambridge University Library, DAR LIB T.620 (1821).

29 DAR LIB T.620. See Joyce Dixon, 'Capturing Colour on HMS Beagle: Charles Darwin and Werner's Nomenclature of Colours (1821)', *The British Journal for the History of*

exhibit Darwin's marginal markings and handwritten notes; most conspicuously, the front flyleaf contains a palimpsestic collection of pencil fieldnotes, repeatedly erased and inscribed anew. These marks, made with the book held upside down, reflect what Mario Di Gregorio characterises as Darwin's 'hyper-methodical' habits of data collection.³⁰ The topmost layer of these inscriptions contains Syme's terms ('ash grey', 'dutch orange'), used here to describe the fleshy parts of ornithological specimens, hurriedly recorded before their colours began to fade.³¹ Darwin later transcribed these notes into the manuscript of his collected zoological observations, along with several hundred additional references to Syme's terms.³² The physical condition of Darwin's copy evidences the extent to which the young naturalist relied on Syme's book as a paper device for the processing of biological colour. As stated in *The Zoology of the Voyage of H.M.S. Beagle* (1838–1843), published after Darwin's return, 'a comparison was always made with the book [*Werner's Nomenclature*] in hand, previous to the exact colour in any case being noted'.³³

In the University of Pennsylvania Libraries, another naturalist-owned copy presents a densely-inscribed example of what Heather Jackson terms 'the annotator's art'.³⁴ Previously the property of the American naturalist and philologist Samuel Stehman Haldeman (1812–1880), this

Science, 59.1 (2026), 17–40, <https://doi.org/10.1017/S0007087425101726>.

- 30 Mario A. Di Gregorio and N.W. Gill, *Charles Darwin's Marginalia* (New York: Garland, 1990), p. xiii.
- 31 'Beak of female: ash grey/male nearly black/legs &c. exact dutch orange'. The inscription describes the striated caracara (*Phalacrocorax australis*), collected by Darwin in the Falkland Islands in April 1834. Below this is a description of another bird with 'ash grey' features. Cambridge, Cambridge University Library, DAR LIB T.620 (1821), p. 2 [n. p.].
- 32 Cambridge, Cambridge University Library, GBR/0012/MS DAR 30-31 Charles Darwin's manuscript notes 'Zoological Diary: Observations on Zoology of the Places Visited During the Voyage of H.M.S. Beagle, 1832–1836'. Available in *Charles Darwin's Zoology Notes & Specimen Lists from H.M.S. Beagle*, ed. by Richard Keynes (Cambridge: Cambridge University Press, 2000).
- 33 Leonard Jenyns, *The Zoology of the Voyage of H. M. S. Beagle, Under the Command of Captain Fitzroy, R. N., During the Years 1832 to 1836, Part 4 (Fish)*, ed. by Charles Darwin (London: Smith, Elder & Co., 1842), <https://www.biodiversitylibrary.org/bibliography/109909>, p. 6.
- 34 H.J. Jackson, *Marginalia: Readers Writing in Books* (New Haven: Yale University Press, 2001), p. 7.

1821 edition preserves multiple layers of habitual attention directly on the page. Perhaps the most striking record of its regular thumbing are the handy tabs, cut out and coloured at the pages' edges, which provide a visual index of its contents and facilitate repeat perusal. This perusal manifests through the presence of marks in pencil and ink, biological material, scraps of fabric and swatches of paint.³⁵ Each inscription and addition is an attempt to refine, expand or translate Syme's nomenclature, transforming this particular copy into a unique receptacle for chromatic knowledge-gathering.

In his early career, Haldeman garnered a reputation for his meticulous methods of biological observation, before his interests shifted to the etymological and philological in later life.³⁶ Haldeman's copy of *Werner's Nomenclature* speaks materially to this preoccupation with linguistic precision, and with the accurate articulation of natural phenomena. Haldeman's attempts to further refine and define Syme's colours appear in the charts' margins and cells as numerous zoological, botanical and mineralogical referents. For example, the additions of 'Pale browned coffee beans' and 'Pale persimmon seeds' enhance the epistemic strength of 'Yellowish Brown', while the European leaf beetle ('*Chrysomela sanguinolenta*?') tentatively accompanies Syme's 'Largest black slug' to elucidate 'Bluish Black'.³⁷ In the table of yellows (Figure 9.2)—below Syme's 'Wings of goldfinch./Canary bird.'—pencil markings provide an additional ornithological exemplar (the 'breast of the mead. [meadow] lark') for 'Gamboge Yellow'. Haldeman includes a physical sample of this bright canary-yellow, pasting to the page a lark's feather, identified in pencil as '*sturnellus ludovicianus*'. Additional swatches are also present: the unnamed colour '81½' has been added beneath Syme's no. 81 ('Deep Reddish Orange'), while '90½' (the swatch now missing) has been written above Syme's no. 91 ('Carmine Red').

35 Pennsylvania, University of Pennsylvania Libraries, Smith 667.2 W498 (1821), <https://colenda.library.upenn.edu/catalog/81431-p30r9mm5x>.

36 See W. Sorensen, 'Haldeman, Samuel Stehman (1812–1880), naturalist and philologist', *American National Biography* (February 2000).

37 Smith 667.2 W498 (1821), p. 78 [n. p.]; p. 42 [n. p.].



Fig. 9.2. Yellow chart from S.S. Haldeman's copy of Werner's *Nomenclature of Colours* (1821) showing pencil annotations, pasted-in additions and index tabs on the right-hand edge of pages. University of Pennsylvania (667.2 W498), Kislak Center for Special Collections, Rare Books and Manuscripts, University of Pennsylvania.

Haldeman also quotes alternative published lexicons for the descriptions of natural objects: beside Syme's written elucidation of 'Liver Brown' is the note '607 hepaticus. "color of boiled liver"'—a direct reference to Johann Karl Wilhelm Illiger's *Terminologie* (1800).³⁸ Elsewhere, Haldeman cites the English translation of Hermann Burmeister's *Manual of Entomology* (1836), whose list of forty-nine colours represents a mixture of Latinate ('Lacteous', 'white, with a bluish tint like milk') and English terms ('Coal-black', 'a deep shining black, with a bluish tint').³⁹ As neither of these works contain colour samples, this copy of *Werner's Nomenclature* functions in part as a visual companion to these alternative terminologies.

Haldeman's dynamic interventions constitute a highly individualised chromatic scrapbook. While the primary function of his copy was evidently the consolidation of colour concepts, extra-copy information suggests that Haldeman also employed *Werner's Nomenclature* in much the same way as Darwin: as a fixed lexicon with which to furnish his biological observations. In his illustrated survey of American molluscs, *A Monograph of the Freshwater Univalve Mollusca of the United States* (1840–1866), Haldeman makes repeated use of Syme's terms. In the 1842 volume—dealing specifically with American bladder snails—he describes the colouration of the *Paludina subpurpurea* in the following terms: 'The tint is difficult to define, but would be approached by a dark shade of Syme's "brownish purple red" mixed with dark "broccoli brown;" the inside being a lighter tint of the same color'.⁴⁰

In 1844, Haldeman published a paper titled 'Enumeration of the Recent Freshwater Mollusca...', stemming from these close studies of shelled creatures.⁴¹ In it, Haldeman applied his forensic knowledge of conchology to pen a spirited explication of the controversial Lamarckian

38 Johann Karl Wilhelm Illiger, *Johann Karl Wilhelm Illiger's Versuch einer Systematischen Vollständigen Terminologie für das Thierreich und Pflanzenreich* (Helmstädt: C.G. Fleckeisen, 1800), <https://www.biodiversitylibrary.org/bibliography/37079>, p. 87.

39 Hermann Burmeister, *Manual of Entomology*, trans. by W.E. Shuckard (London: Edward Churton, 1836), <https://archive.org/details/manualofentomolo00burm>.

40 S.S. Haldeman, *A Monograph of the Freshwater Univalve Mollusca of the United States: Including notices of species in other parts of North America* (Philadelphia: E.G. Dorsey, 1842), p. 29, <https://www.biodiversitylibrary.org/bibliography/26897>.

41 S.S. Haldeman, 'Enumeration of the Recent Freshwater Mollusca Which are Common to North America and Europe, with Observations on Species and their Distribution', *Boston Journal of Natural History*, 4 (1843–4), 468–84.

theory of species transmutation, which he calls the 'instability of species'.⁴² Haldeman's paper was later referenced by Darwin in the revised edition of *On the Origin of Species* (1861): 'Professor Haldeman [...] has ably given the arguments for and against the hypothesis of the development and modification of species: he seems to lean towards the side of change'.⁴³ It seems an analytical eye for chromatic variation was a recurring prerequisite for evolutionary understanding: both Darwin's and Haldeman's theories were preceded by intensive engagement—both intellectual and physical—with their respective copies of Syme's book. Having discussed the impact of these particular book-copies on the theory and practice of natural history in the nineteenth century, I will now turn to the aesthetic and design implications of select copies of Syme's work.

Harmonious Colours

In addition to the deliberate annotations made by the likes of Darwin and Haldeman, copies of Syme's book exhibit a scattering of paint smudges, transferred from the brushes and fingertips of careless readers.⁴⁴ These marks speak to an alternative relevance for *Werner's Nomenclature*, beyond the description and identification of natural-historical hues. As its full title states, Syme's book was intended to be equally as applicable to 'the Arts' as the sciences: this section explores a number of copies that speak to the significance of *Werner's Nomenclature* for the theory and application of decorative colour.

One such copy contains a carefully constructed, half-complete chromatic schema on its blank endpapers.⁴⁵ This comprises twenty-two ruled triangles, interconnected to form a pyramidal shape. Each of the shape's points contains the word 'Black', with the schema's centre marked by 'White' and flanked by the primaries 'Yellow', 'Blue' and

⁴² *Ibid.*, p. 478.

⁴³ Charles Darwin, *On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life* (London: J. Murray, 1861), <https://archive.org/details/b28075134/page/n5/mode/2up>, p. xv.

⁴⁴ For example, Edinburgh, National Galleries Scotland, NH 10 Syme 1821 (1821).

⁴⁵ Montreal, McGill University Library, ND1510 W5 1821 (1821), https://archive.org/details/McGillLibrary-rbse_werner-nomenclature-colours_ND1510W51821-20617/page/n9/mode/2up.

'Red'. The remaining triangles are occupied by various intermediary colours including 'Russet', 'Citron' and 'Slate'. Erased guidelines are just visible, while beneath the completed schema are four additional rows of triangles, empty of text. The published form of this diagram appears in an 1836 publication by the Scottish interior decorator and colour theorist David Ramsay Hay (1798–1866), titled *The Laws of Harmonious Colouring*. The schema's purpose, according to Hay's text, is to illustrate 'a general harmony of all the colours of any distinctive character', with each 'limb' of the schema producing a 'distinct melody' of the primary colours.⁴⁶

While Hay makes only brief reference to Syme in this 1836 publication, an earlier edition of *The Laws of Harmonious Colouring* (1828) repeatedly cites Syme's colours as a means to elucidate Hay's own theories and observations. For example, Hay's discussion of 'colours individually' is in partial dialogue with Syme's work. Elucidating the visual nuances of the primary colour groups, he observes that Syme's whites comprise 'no fewer than eight different tints [...] and although the terms reddish-white, &c. are rather anomalous, yet there seems to be no other way of denominating the lightest shades of colours'.⁴⁷ Discussing the nomenclatural confusion surrounding the colour 'crimson', Hay describes Syme's 'Crimson Red' as 'a very different tint from those bright and overpowering colours which generally receive that name'.⁴⁸ The natural palette of *Werner's Nomenclature* may also have guided Hay's opinions on the desirable ratios of certain kinds of colour:

Nature has pointed out in the most distinct manner, that those colours which are most agreeable to the eye should predominate, and that vivid and intense colours should upon all occasions be used with a sparing hand, and only employed to heighten the effect of splendour and richness by their contrasting and attractive qualities.⁴⁹

Hay later authored the influential work *A Nomenclature of Colours, Applicable to the Arts and Natural Sciences, to Manufacturers and Other*

⁴⁶ David Ramsay Hay, *The Laws of Harmonious Colouring: Adapted to Interior Decorations, Manufactures, and other Useful Purposes* (Edinburgh: William and Robert Chambers, 1836), https://archive.org/details/gri_33125008297851, p. 17.

⁴⁷ David Ramsay Hay, *The Laws of Harmonious Colouring Adapted to House Painting* (Edinburgh: D. Lizars, 1828), p. 41.

⁴⁸ *Ibid.*, p. 55.

⁴⁹ *Ibid.*, p. 9.

Purposes of General Utility (1846).⁵⁰ This contains a lengthy explication of Hay's updated colour theory, elucidated by forty plates containing various combinations of 'complimentary' and 'harmonious' colours. These are set out in stacked triangles reminiscent of the chromatic diagram in his earlier work—the diagram that appears to have been first sketched out in Hay's copy of *Werner's Nomenclature*.⁵¹

Despite clear similarities between Hay's 1846 *Nomenclature* and Syme's—for instance, the close echo of their respective titles, and their sharing of a publisher (William Blackwood, 1776–1834), a printer (James Ballantyne, 1772–1833) and an engraver (William Home Lizars, 1788–1859)—Hay omits any direct reference to Syme's publication. Hay was apparently keen to establish the bibliographical novelty of his new work, whose purpose, his introduction explains, was not to engage with the infinite varieties of colour encountered by 'the botanist, the naturalist, and the mineralogist'.⁵² Rather, it was to 'classify, arrange, and define colours' so that his readers might better comprehend 'the nature of each particular hue, tint, and shade, and the relation that it bears to the primary elements of light, darkness, and colour'.⁵³

Regardless, it is clear from the presence of Hay's graphic marginalia that Syme's book functioned as a starting point for his authorship on colour, providing a visual reference for Hay's emerging aesthetic theories—for thinking through the intricacies of 'harmonizing', 'neutralizing' and 'accidental' colours, and mapping the nuanced distinctions between 'hues', 'tints' and 'shades'. It is perhaps also not coincidental that Hay, like Syme, used paper clippings for the colour schemes in his own *Nomenclature*.

Werner's Nomenclature also appears to have been an influential reference for the English Egyptologist, author and avid book collector John Gardner Wilkinson (1797–1875), whose signed copy is now at Calke Abbey.⁵⁴ Wilkinson's intention in perusing Syme's charts also had

50 David Ramsay Hay, *A Nomenclature of Colours, Applicable to the Arts and Natural Sciences, to Manufactures and Other Purposes of General Utility* (Edinburgh: William Blackwood and sons, 1846), <https://archive.org/details/nomenclaturecol00hayd/>.

51 Although the book is unsigned, the diagram suggests that the McGill copy was owned by Hay.

52 Hay, *A Nomenclature of Colours* (1846), p. 11.

53 *Ibid.*, pp. 11–12.

54 Derbyshire, Calke Abbey (1821). The inscription reads 'Professor Jameson/21, Royal Circus,/Gardner Wilkinson'.

an aesthetic impetus: like Hay, Wilkinson cites Syme in his 1858 work *On Colour and on the Necessity for a General Diffusion of Taste Among all Classes*. While Wilkinson shares with Syme a preoccupation with the standardisation of colour, his central focus is on defining the chromatic parameters of 'good' taste and 'bad'. His own published colour chart is comparatively succinct, set out in a small horizontal scale of chromolithographed rectangles, finished with washes of watercolour applied by hand. It comprises only those colours commonly required for decorative purposes: 'viz. a. blue, b. red, c. scarlet, d. crimson, e. cerise, f. purple, g. yellow, h. orange, i. green, k. tea-green, l. brown, m. horsechesnut, n. chesnut, o. black'.⁵⁵

For a more practical and extensive guide to the naming of colours, Wilkinson directs his readers to 'a very useful work on the subject ("Werner's Nomenclature of Colours")', where he will find a great number of them treated in a very practical manner, with their hues illustrated by references to objects in the animal, vegetable, and mineral world'.⁵⁶ Even in the mid-nineteenth century, when Syme's colours were increasingly threatened with material instability and cultural obsolescence, *Werner's Nomenclature* continued to function as an authoritative work of nineteenth-century anglophone chromatics; a habitual starting point for understanding, articulating and developing colour concepts. In the final section of this chapter, I will explore the book's continued applicability for the purposes of chromotaxonomy in the second half of the nineteenth century.

The Chromotaxonomic Project Continued

The practical value of Syme's book—its usefulness as a fixed standard for identifying and naming colours—persisted even into the final decades of the century. This is articulated in a copy once belonging to the British ornithologist James Edmund Harting (1841–1928), which contains the following inscription: 'This seems to be a very scarce book—at the same time a most useful one. With great difficulty I found

⁵⁵ John Gardner Wilkinson, *On Colour and on the Necessity for a General Diffusion of Taste Among all Classes* (London: John Murray, Albemarle Street, 1858), p. xii, <https://archive.org/details/oncolouronnecess00wilk/page/n7/mode/2up>.

⁵⁶ *Ibid.*, p. 91.

a second copy which I gave to Mr Robert Ridgway [in] February 1882. J.E.H.⁵⁷ Harting's copy contains no further marginalia of note, and we might easily miss the significance of Syme's book to its owner without identifying the 'second copy' to which Harting refers. This partner copy is located in the Smithsonian Institution, and (as Harting's inscription suggests) was once the property of the American ornithologist Robert Ridgway (1850–1929).⁵⁸

Contained between the pages of the Smithsonian copy is a letter from Harting, recounting the circumstances of the book's acquisition. After 'making enquiries in all directions', the letter explains, Harting had finally succeeded in procuring a copy of *Werner's Nomenclature*.⁵⁹ Having been in circulation for six decades, the copy received by Ridgway exhibited inevitable signs of wear, as Harting acknowledged:

I am sorry that it is not in better condition, many of the leaves having spotted with damp—but it is I believe perfect, and will therefore perhaps answer your purpose. It is a pity that there is no modern edition of this book, for if it were circulated amongst naturalists it would be most useful in furnishing a standard nomenclature of colours to which everyone could refer...

Harting goes on to relate his own attempts to publish a new edition of *Werner's Nomenclature* in London, 'revised, say, by such an excellent painter of animal life as Joseph Wolf'.⁶⁰ While this never came to fruition, Harting maintained his confidence in the project: 'surely it ought to be possible to find at least 500 subscribers amongst zoologists & botanists, to say nothing of artists to whom such a book, one would think, ought to be useful'.⁶¹

In Washington, D.C., Ridgway had almost certainly conceived of a similar project when first requesting a copy of the book from

57 London, Natural History Museum, SB 93 o SYM (1821) [n. p.], p. 1.

58 Washington, DC, Smithsonian Institution, Cullman Library Rare Books, ND1285 .W49 1821 c.2 (1821), <https://archive.org/details/wernernomencl00wern/mode/2up>.

59 Letter ([3] p.), dated 8 February 1882, from J. E. Harting to Robert Ridgway attached to front paste-down of ND1285 .W49 1821 c.2.

60 Joseph Wolf (1820–1899) was an artist and illustrator of natural-historical subjects who worked at the British Museum.

61 ND1285 .W49 1821 c.2.

Harting. Four years after receiving his copy of *Werner's Nomenclature*, Ridgway published *A Nomenclature of Colors for Naturalists* (1886), containing 186 colours collected in nine charts. In his introduction, Ridgway describes his intention to supply naturalists with 'a means of identifying the various shades of colors named in descriptions, and of being able to determine exactly what name to apply to a particular tint'.⁶² He refers to Syme's work as 'the latest publication' of this kind available to him—despite a gap of sixty years—which was 'carefully consulted' in the compilation of his own nomenclature.⁶³ The remnants of this careful consultation are present on and between the pages of Ridgway's copy, in the form of marginal ticks and crosses, annotations and paint smudges, as well as a selection of paper items including finger-sized rectangular swatches, coloured and uncoloured, bearing Syme's colour names.

The blue chart's marks and marginalia map directly to Plate IX of Ridgway's *Nomenclature of Colors*. Comprising three columns and eight rows, Ridgway's chart contains twenty-three rectangular samples, painted directly onto the page with a number and a name printed below. Ridgway adopts all but Syme's crossed-off 'Scotch Blue', and, as per his annotations (see Figure 9.1), substitute Syme's 'Greenish Blue' and 'Greyish Blue' for Werner's original 'Sky' and 'Smalt'. In addition, Ridgway includes non-Syme terms such as 'Marine Blue', 'Cobalt Blue' and 'Sevres Blue'. Ridgway's blues double Syme's in number, reflecting advances in both biological discovery and pigment manufacture during the intervening decades. Finding Syme's colours 'so modified by time, that in very few cases do they correspond with the tints they were intended to represent', Ridgway mixed up his own approximations by 'careful selection from the fine artists' colors manufactured by the most celebrated makers of the present day (which are believed to be very far superior in purity, as well as much more varied, than those made in Werner's time)'.⁶⁴ Indeed, few copies of *Werner's Nomenclature* still

62 Robert Ridgway, *A Nomenclature of Colors for Naturalists: And Compendium of Useful Knowledge for Ornithologists* (Boston: Little, Brown and Company, 1886), p. 9, https://archive.org/details/gri_c00033125011473457.

63 *Ibid.*, pp. 9–10.

64 *Ibid.*, p. 10.

exhibit the chromatic fidelity they initially possessed, with many of the colours having faded and mottled over time.⁶⁵

Two decades later, Ridgway published a second chromotaxonomic work titled *Color Standards and Colour Nomenclature* (1912). Highly influential throughout the twentieth century, this 1,000-strong compendium of colours influenced the development of modern colour systems, and is still considered a standard reference across the arts and sciences.⁶⁶ While fewer of Syme's terms appear in Ridgway's 1912 publication, *Werner's Nomenclature* continued to represent a constant source of chromatic consultation. Syme's publication (along with Hay's 1846 *Nomenclature of Colours*) is among the list of sources Ridgway cites in the introduction to his *Color Standards*:

Werner's 'Nomenclature of Colours' (Syme's edition, 1821), Hay's 'Nomenclature of Colours' (1846), Ridgway's 'Nomenclature of Colors' (1886), Saccardo's 'Chromataxia' (1891), Mathews' 'Chart of Correct Colors of Flowers' (American Florist, 1891), Willson and Calkins' 'Familiar Colors,' Oberthur and Dauthenay's 'Repertoire des Couleurs' (1905), Leidel's 'Hints on Tints' (1893), 'Lefèvre's Matieres Colorantes Artificiales [sic]' (1896), the Standard Dictionary chart of 'typical colors'...

Syme's book resides at the head of this list of nineteenth-century chromatic texts, retaining its primary relevance for the development of colour classification and standardisation even into the twentieth century.

65 Lead-based *Snow White* is particularly fugitive, degrading to a mottled grey in multiple copies, as in University of Edinburgh Library, RB.S.449 (1814). It is not clear when this would have begun to take place; as discussed, Gardner Wilkinson maintained the book's practical utility as late as 1858, and the naturalist John Richardson referred to its charts for his 'Report on the Ichthyology of the Seas of China and Japan', in *Report of the British Association for 1845* (London: R. and J.E. Taylor, 1846), <https://www.biodiversitylibrary.org/bibliography/59530>. The use of Syme's terms after 1850 is rare.

66 Elaine Charwat, 'Colours in Zoology: Subjective or Systematic?', in *Nature's Palette: A Colour Reference System from the Natural World*, ed. by Patrick Baty (London: Thames & Hudson Ltd, 2021), pp. 122–43 (p. 143), <https://doi.org/10.2307/j.ctv18b5d8x>.

67 Robert Ridgway, *Color Standards and Color Nomenclature* (Washington, DC: Published by the author, 1912), <https://archive.org/details/colorstandardsc00ridg>, pp. 11–12.

Conclusion

Of the unique information contained in individual copies of a book, J. A. Dane has written 'I have begun to feel I know exactly what I will say about any book-copy well before I begin to examine it'.⁶⁸ This could not be further from my own experience in conducting the research that underpins this chapter. As I have demonstrated, the evidence contained in surviving copies of *Werner's Nomenclature* offers a unique window into the practical import and cultural resonance of Syme's book for nineteenth-century discourse on colour. Such evidence unveils the myriad ways in which individuals interacted with this rare and textural chromatic dictionary. Uncovering a catalogue of interdisciplinary uses, this chapter has revealed the extent to which Syme's book operated as both a conceptual and material starting point for chromatic investigation—whether in the context of scientific observation, aesthetic theory or chromotaxonomy.

More broadly, the examples discussed have revealed the importance of material colour for imbibing knowledge of coloured things; the translation of Werner's textual nomenclature into paint added haptic and visual dimensions, engendering a uniquely useful object in which the different 'complexions' of colour coalesce.⁶⁹ These copies have also shown how Syme's experiment to fix the changeableness and subjectivity of colour informed the later development of more abstract reflections on colour harmony, aesthetics and taste. What these material leftovers communicate most strongly is that, if you scratch the surface of chromatic discourse in the nineteenth century, you are very likely to encounter a copy of Patrick Syme's book.

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Anonymous, 'Summer Class for Botanical Drawing, for Ladies only, on Monday the 9th day of July, at 10 o'clock', *The Edinburgh Evening Courant* (Edinburgh: printed by Mr. David Ramsay and company, 5 July 1804).

⁶⁸ Dane, *Blind Impressions*, p. 3.

⁶⁹ Chris Horrocks, *Cultures of Colour: Visual, Material, Textual* (New York: Berghahn Books, 2012), <https://doi.org/10.1515/9780857454652>, p. 2.

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10. Between Heritage, Militaria and Concept: The Magenta Case

Marie-Anne Sarda

For historians of literature and art as well as scientists, colour naming has been of increasing interest over the past few decades. Whatever the field of colour investigation, experts are constantly striving for a fair definition of the chromatic ranges.

Historians of the Middle Ages have long noted that the names given to colours in the West often refer to the raw materials from which they were obtained, or to the dyeing techniques used. As woollen cloth was the most common manufactured product, European merchants, weavers and dyers had to agree on a standardised colour naming system to distinguish their products from each other. In the Florentine textile industry, for example, the colour name ‘scarlatto’ meant that the cloth had been dyed with kermes, while the name ‘sanguigno’ meant dyed with madder and ‘cremisi’ with Armenian or Polish cochineal. When the merchants ordered cloth from drapers or dyers, they asked for scarlet or crimson, but never red.¹ The vocabulary used comprised the industry vernacular, as well as technological and/or commercial terms, which governed the establishment of a terminology for colours in Western European languages. This vocabulary, although enriched over centuries, lasted until the 1850s. What happened then?

Our contemporary view of colours was shaped during the second

1 John Munro, ‘The Medieval Scarlet and the Economics of Sartorial Splendour’, in *Cloth and Clothing in Medieval Europe: Essays in Memory of E. M. Carus-Wilson*, ed. by Negley B. Harte and Kenneth G. Ponting (London: Pasold Research Fund and Heineman, 1983), 13–70. Mathieu Harsch, *La Teinture et les matières tinctoriales à la fin du Moyen Âge. Florence, Toscane, Méditerranée* (Rome: Viella, 2024).

quarter of the nineteenth century by Michel-Eugène Chevreul (1786–1889), a French chemist and head of the Gobelins dyeing workshop in Paris. Abandoning Colbert's organisation of the colour field based on five 'simple colours' (blue, red, yellow, fawn and black),² Chevreul established during the 1840s his colour circles based on the decomposition of white light by Isaac Newton (1643–1727). Comprising six colours (red, orange, yellow, green, blue and violet), the spectrum was reorganised by Chevreul into a bicycle wheel of seventy-two spokes. Each of the seventy-two colours was further divided into a range of twenty shades, ranging from clear to dark. Chevreul also created nine more circles, for colours called 'rabattues', which meant mixed with black.³ From Chevreul's point of view, anyone could designate a shade by its precise location within the 'chromatic circles', thus allowing the dyers to reproduce it. Did Chevreul's systematic colour classification encourage contemporaries to perceive colours as abstract? What particular role did the new synthetic dyes have within this context?

Discovered in 1856 by William Henry Perkin (1838–1907), a violet synthetic dye, based upon aniline, sparked international competition. Designated by Perkin in his 1856 patent as 'lilac or purple', it was marketed in 1858 as 'Tyrian purple'. The English term 'purple' is by far more accurate than the French word '*pourpre*' because it encompasses a much wider range of shades, from pink to violet. In naming his discovery 'Tyrian purple', Perkin was inscribing it in the prestigious tradition of purple and reddish violets, which was rejuvenated in the 1840s. This European textile context preceding the aniline revolution thus deserves an in-depth examination.

Secondly, as studied in great detail by Anthony Travis, the aniline revolution needs to be re-examined.⁴ Housed in the British Library, the British patents have long been known, partly because of the classified

2 Jean d'Albo, *Instruction générale pour la teinture des laines et manufactures de laine de toutes couleurs, & pour la culture des drogues ou ingrédients qu'on y emploie* (Paris: de l'Imprimerie François Muguet, 1671), p. 11.

3 The first chromatic circle, made from wools, was presented at the 1851 Universal Exhibition in London (Paris, Mobilier national, inv. GMTB-799-000). All the circles and colour ranges—14,420 shades—were published in 1855. Michel-Eugène Chevreul, *Cercles chromatiques* (Paris: Digeon, 1855).

4 Anthony S. Travis, *The Rainbow Makers: The Origins of the Synthetic Dyestuffs Industry in Western Europe* (Bethlehem: Lehigh University Press, 1993).

abridgements published as soon as the patents were granted. Very few French patents were submitted in London on account of official French restrictions. As Travis pointed out, the aniline revolution cannot be completely understood without a thorough study of French patents, which has only been made possible in the recent years, since the INPI—the French equivalent to the British Patent Office—have recently digitalised all the historical patents.⁵ Issued on July 2025, a new and thorough study of synthetic dyes between 1856 and 1914 by Maarten R. van Bommel and Matthijs de Keijzer confirms the specific competition between Britain and France regarding aniline colours.⁶

Lastly, we must evaluate the accuracy of the colour names associated with the aniline colours. While the mid-Victorian journal *Punch* declared in 1859 that the city of London was ill with ‘Mauve Measles’, the word ‘mauve’ entered the Oxford English Dictionary.⁷ Other names were created during the aniline revolution, such as ‘fuchsine’, ‘harmaline’, ‘violine’, ‘roseine’, ‘azaleine’, most of them referring to purplish flowers. But none of those terms had the impact of ‘magenta’.⁸ Amongst the harsh colour naming competition between European inventors, how did the name of an Italian town where Napoleon III conducted a victorious battle come to be adopted to designate a fashionable new colour?

William Perkin and ‘Tyrian Purple’

A student of August-Wilhelm Hofmann (1818–1892) at the Royal College of Chemistry in London, Perkin accidentally discovered a solid purple dye on silk in his own home laboratory on Easter 1856. The

5 <https://www.inpi.fr/archives-historiques-INPI>. The database comprises all the patents submitted between 1791 and 1903.

6 Maarten R. van Bommel and Matthijs de Keijzer, *Bright Colours from the Past. The History, Chemistry, Characterisation and Application of Synthetic Dyes Between 1856 and 1914* (Springer Nature Switzerland, 2025).

7 Charlotte Nicklas, ‘New Words and Fanciful Names: Dyes, Colour, and Fashion in the Mid-Nineteenth Century’, in *Bright Modernity: Colour, Commerce, and Consumer Culture*, ed. by Regina Lee Blaszczyk and Uwe Spiekermann (Cham, Switzerland: Palgrave Macmillan, 2017), p. 99. Thanks to Charlotte Ribeyrol for drawing my attention to this point.

8 This research, carried out in 2023, answers a question about the colour magenta that Dr Charlotte Nicklas—senior lecturer at the centre for Design History at the University of Brighton—had asked me many years before. I therefore owe it to Charlotte to have undertaken this stimulating case study.

major textile manufacturers who had already improved processes with metal mordants were powerful within the Royal College of Chemistry, sponsoring the research. Although silk was highly fashionable, the key problem for dyers at the time was dyeing and printing cotton, in order to supply for the increasing demand from the middle classes. Aware of the importance of his discovery, Perkin immediately protected it by filing a patent on 26 August 1856 (No. 1984). The patent is entitled: 'The production or application of a new colouring matter for dyeing silk, cotton, wool and other materials to purple or lilac colours'. By referring to the colours purple and lilac, Perkin certainly intended to meet the demand for a precise range of colours, a point which will be addressed later in this chapter. He resigned from his position with Hofmann in October 1856 to devote himself to his invention. Supported by his entourage, he continued to experiment. In December 1857, a 'Perkin & Sons' dye factory was set up in Greenford Green, northeast of London, and the new dye was marketed under the name 'Tyrian purple'.⁹

The colour known as purple is considered one of the most beautiful dyes ever produced by nature and enhanced by experienced dyers, many centuries before our era.¹⁰ As described by Pliny the Elder in his *Natural History*, the main species of sea snail used for this colour was *Hexaplex trunculus*, also known as *Murex trunculus*. One variety produced reddish-purple pigments, while another produced bluish-purple pigments, which could also be mixed to produce intermediate colours. To name a synthetic dye 'Tyrian purple' was, of course, a historical reference to the murex shell, Tyre in Lebanon being one of the principal cities in the Middle East where ancient purple was extracted.¹¹ The colour purple did not exist in either Newton's spectrum nor Chevreul's chromatic circles. As a result, numerous debates have arisen as to the identification of purple. Still, and as Zvi Koren recently wrote, 'a colourful picture emerges that reveals how the dyer and weaver created variegated shades of purple [...] from reddish-purple

9 Travis, pp. 31–64; Bommel, de Keijzer, pp. 133–43.

10 John Edmonds, *The Mystery of Imperial Purple Dye*, Historic Dye Series No. 7 (self-published, 2000); Dominique Cardon, *Le monde des teintures naturelles* (Paris: Belin, 2003; revised edition, 2014), pp. 529–84.

11 Christine Macheboeuf, *Exploitation et commercialisation de la pourpre dans l'Empire romain* (Pessac: Ausonius éditions, 2022).

(including burgundy, maroon, crimson, *etc.*) with a preponderance of the red component in the mixture, and conversely to a bluish-purple or violet colour when blue is the dominant constituent'.¹²

In Perkin's day, purple and its natural origins were still shrouded with mystery and studied by scientists. In 1859, Henri de Lacaze-Duthiers (1821-1901), a professor of zoology at Lille University, published a 'Memoir on purple' in France before submitting it to the London Royal Society in an article entitled 'A Natural History of Ancient Purple'.¹³ While the natural purple resources of sea snails had been exhausted, the colour purple was still praised by the wealthy from the Renaissance to modern times, synonymous with power, wealth and elegance. Dyestuffs manufacturers and dyers thus went on developing processes to compensate for this lack of murex.

Purple and Violet: European Fashion During the 1840s

According to Travis, the violet shades obtained from aniline dye precursors were fashionable from 1855 to 1860, which may have encouraged Perkin to turn his accidental discovery into a marketable textile dye. In reality, these dyes were in vogue as early as the 1840s. Alison Matthews David published a hand-coloured engraving from the *London and Paris Magazine* of 1840, which shows lilac and purple dresses along with fashionable light green dresses.¹⁴ English literature also attests to the popularity of these colours. Elizabeth Gaskell (1810–1865), for example, in her novel *Mary Barton* published in 1848, writes that the titular Mary was very fond of her everyday dress, 'Hoyle's print you know, that lilac thing with the high body'.¹⁵ At this time, Thomas Hoyle owned the Mayfield Print Works, a calico printing established

12 Zvi C. Koren, 'Archaeological Shades of Purple from Flora and Fauna from the Ancient Near East', in *Archaeological Chemistry. A Multidisciplinary Analysis of the Past*, ed. by Mary Virginia Orna and Seth C. Rasmussen (Cambridge: Cambridge Scholars Publishing, 2020), pp. 256–300 (pp. 256–57).

13 Henri de Lacaze-Duthiers, 'Mémoire sur la pourpre', *Annales des sciences naturelles*, 4^e série, Zoologie XII, pp. 5–84; 'Histoire naturelle de la pourpre des Anciens', manuscript of a scientific paper submitted to the Royal Society, 1859–1860; London, Royal Society, AP/43/6.

14 Alison Matthews David, *Fashion Victims. The Dangers of Dress Past and Present* (London, New York and Dublin: Bloomsbury, 2015), p. 78.

15 Elizabeth Gaskell, *Mary Barton* (London: Penguin Popular Classics, 1994), p. 258.

near Manchester. In *Cranford*, published by Gaskell in 1853, a woman is choosing a new crimson silk dress for winter, whereas for the summer she prefers a lilac dress with yellow spots.¹⁶

Crimson reds, which are close to purple in both saturation and hue, have never gone out of fashion and can be found in public collections. The first half of the nineteenth century was no exception. Dating from the end of the French First Empire, an elegant dress in a splendid state of preservation may be found in the permanent collection of the Palais Galliera in Paris.¹⁷

A printed wool dress made in England around 1836–1838, in a complicated design of shamrocks on a (now-faded) lilac and brown chequered background, kept in the storage of the Victoria and Albert Museum, is a precious example of a middle-class day dress. Stitch marks on the sleeves suggest indeed that they were reworked from an earlier style to update the dress to the latest fashion.¹⁸ Within the same collection, a later dress made of silk satin shows a complex arrangement of purple, crimson, pink, grey and white. It also shows signs of alteration in order to accommodate a change in style.¹⁹ The taste for lilac tones was so developed that it was also adopted for girls' dresses, such as in a lilac-striped white cotton dress dating from 1846 housed in the Palais Galliera in Paris.²⁰

French and British industrial and artistic archives confirm that purple, lilac and reddish violet hues were fashionable during the 1840s and 1850s. Created in 1839, the British Office of the Registrar of Designs offered textile manufacturers an opportunity to protect their designs in an extremely disputed European market.²¹ Major British and

16 Elizabeth Gaskell, *Cranford* (London: Penguin Popular Classics, 1994), p. 172.

17 Paris, musée de la mode de la Ville de Paris, Palais Galliera, inv. 1962.108.30: *Dress*, silk, between 1819 and 1829, <https://www.parismuseescollections.paris.fr/fr/palais-galliera/oeuvres/robe-habillee-0>.

18 London, V&A, inv. T.11-1935, <https://collections.vam.ac.uk/item/O13833/dress-unknown/>.

19 London, V&A, inv. T.856-1919, <https://collections.vam.ac.uk/item/O13836/dress-unknown/>.

20 Paris, musée de la mode de la Ville de Paris, Palais Galliera, inv. 1952.5.15: *Dress*, cotton, ca. 1846, <https://www.parismuseescollections.paris.fr/fr/palais-galliera/oeuvres/robe-de-fillette-0#infos-principales>.

21 National archives, Kew: Office of the Registrar of Designs, 1839-1852; Board of Trade, Patents, Designs and Trade Marks Office, 1852-1923. From 1839, the Designs

French manufacturers working in the calico printing field protected their designs by submitting dyed and printed samples to the Office.²² In response to the importance and quality of the British textile industry in Manchester, Leeds or Glasgow, the French city of Mulhouse became a centre of expertise in fabric dyeing and printing during the nineteenth century. It comprised not only manufacturers but also a public school of chemistry and a calico-printing museum, which still exist.²³ Major archival resources are housed in the museum, such as sixty unpublished dyer's books given by the Koechlin: a family with five generations of colourists and chemists working in the textile industry.²⁴ As part of a research programme on the transition from natural to synthetic dyes conducted at the French National Institute for Art History, these dyer's books have been described and indexed in a database.²⁵ The last dyer of this family, Daniel Koechlin, who himself benefited from these archives, collected two large sample books describing his family's activities from 1740 to 1930.²⁶ His unpublished books contain textile samples, letters and technical details bearing witness to the technological exchanges between England and France. In 1845, for example, Koechlin-Schouch sent to his son Camille Koechlin a few printed samples from Rouen,

Registration Act provided protection for all 'ornamental' designs, including textiles.

- 22 National archives, Kew. British and French examples of this paper can be found in series BT 43/188-354 (representations) and BT 44/15-27 (registers). Although the system used continued to change as copyright law evolved, from 1842 onwards the protection process always involved two basic types of registration: representations and registers. Representations, such as textile samples, were glued together in large bound volumes to which a registered design number was affixed, often stamped on the samples. The same number is entered in the registers.
- 23 École nationale supérieure de chimie de Mulhouse (<https://www.enscmu.uha.fr/>); Musée de l'Impression sur Étoffes (<https://www.musee-impression.com>).
- 24 The colourists and chemists documented in these resources are: Jean Koechlin (1746–1836), the son of one of the founders of Koechlin, Schmaltzer & Cie, one of the first calico printing factories in Mulhouse; Daniel Koechlin called Koechlin-Schouch (eldest son of Jean; 1785–1871); Camille Koechlin (eldest son of Daniel; 1811–1890); Horace Koechlin (eldest son of Camille; 1839–1899); Daniel Koechlin (eldest son of Horace; 1880–1943). In the dyeing industry, Koechlin-Schouch, Camille Koechlin and Horace Koechlin are well known for their activity and improvements, notably at such important factories as Nicolas Koechlin & Frères (Mulhouse, 1806–1831), Frères Koechlin (Mulhouse, 1831–1923), Steinbach, Koechlin & Cie (Mulhouse, 1852–1875) and Koechlin, Baumgartner & Cie (Lörrach, Germany, 1856–1897).
- 25 <https://corpus.inha.fr/colorants>.
- 26 Darnétal, Archives départementales de Seine-Maritime, fonds Koechlin, 60 J 6 and 60 J 7.

with the following note:

Échantillons genre garancine de Rouen (de Girard)—quelle perfection en impression, nuances et beau blanc—et le violet.

Rouen garancine type samples (by Girard)—what perfection in printing, shades and beautiful white—and violet.²⁷

According to their letters, father and son alike admired different shades of violet obtained either by British or French calico-printers. Employed as a chemist in Frères Koechlin in Mulhouse, Koechlin-Schouch soon began to print violets.²⁸ On 2 November 1848, he sent his son Camille Koechlin a sample of wool printed by Dollfus-Mieg, another famous calico-printer from Mulhouse, explaining that Dollfus-Mieg had considerable success in London with these high-quality printed wools:

Ci-joint un échantillon de mousseline laine riche de chez Dollfus-Mieg ; ils font ce genre en toute perfection et en vendent considérablement à Londres ; tu remarqueras sur cet échantillon que pour aviver le lilas d'orseille, ils impriment une dissolution alcaline sur ce violet, ne pouvant passer en eau de chaux à cause des autres nuances ; tu remarqueras que l'impression alcaline marque sur le vert.

Enclosed is a sample of rich woollen muslin from Dollfus-Mieg; they make this type to perfection and sell a considerable amount in London; you will notice on this sample that to brighten up the lilac of orchil, they print an alkaline dissolution on this violet, which cannot pass through limewater because of the other shades; you will notice that the alkaline impression marks on the green.²⁹

In fact, by 1850, a wide variety of shades of purple, combined with various patterns, were available on cotton and wool in both England and France (see Figure 10.1).³⁰



Fig. 10.1. Image portfolio containing pages from *Samples Register* (1740–1850), Darnétal, Archives départementales de Seine-Maritime, fonds Koechlin, 60 J 6.

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27 Darnétal, Archives départementales de Seine-Maritime, fonds Koechlin, 60 J 6, f. 112.

28 Darnétal, Archives départementales de Seine-Maritime, fonds Koechlin, 60 J 6, f. 113.

29 Darnétal, Archives départementales de Seine-Maritime, fonds Koechlin, 60 J 6, f. 127.

30 Darnétal, Archives départementales de Seine-Maritime, fonds Koechlin, 60 J 6, f. 136–144.

Purple and Violet: New Patents During the 1840s

In order to characterise the novelty of Perkin's dye, we need to look at the work of dyers and dye producers during the decade before 1856. Alongside lengthy over-dyeing processes involving, after mordanting, several passages through different dye vats, two main dyes were used to obtain the purple colour: orchil coming from lichens and murexide.

Lichens have always been used by dyers as natural colouring resources.³¹ Different species have been well known since the seventeenth century, one quite fine—collected in the Canary and Cape Verde Islands—and another more common, known as 'earth orchil'—a variety of mountain lichen collected mid-slope in Europe. Although they produced a variety of tones, most of them were considered 'false colours' because of their poor light fastness, and were banned from French royal dyeing regulations.³² Between 1809 and 1884, no less than thirty-three patents—sometimes supplemented by several certificates of addition—were registered in France for the purpose of improving the extraction, yield and colouring power of orchils.³³

Twenty-five of the thirty-three nineteenth-century patents for orchils were registered between 1840 and 1860, corroborating what we have already underlined about the vogue for purple and violet colours. It is also worth noting that there were virtually no inventions relating to lichens after 1870, aniline violets having completely replaced them. Since the limitations of this chapter do not allow us to present all patents, we are introducing here only the most important of these patents, filed by recognised professionals:

- 9 April 1840, Martin/Badin (Lyon), orchil producer.³⁴
- 27 May 1847, de la Morinière/Gonin/Michelet (Paris), No. 5697, including a dyed sample.
- 20 March 1849, Martin (Lyon), orchil producer, No. 8073.
- 20 December 1849, Clenchard (Paris), orchil producer, No. 9258, including samples of different shades on wool.

31 Cardon, pp. 465–500.

32 d'Albo, p. 17.

33 <https://www.inpi.fr/archives-historiques-INPI>.

34 There were no patent numbers in France before 1844.

- 31 March 1858, Guinon/Marnas/Bonnet (Lyon), dyers, No. 36029, 'French Purple'.
- 23 February 1859, Gillet (Lyon), dyer, No. 39937.
- 16 April 1859, Grison (Déville-les-Rouen), dyer and chemist, No. 40690.

Mainly submitted by dye manufacturers or dyers working in the textile industry in Paris, Rouen and Lyon, most of these patents discuss chemical issues. They all use ammonia, with different durations, and several applicants mention the possibility of adjusting the basic or acidic pH of the dye baths to obtain shades that are more violet or red. Similar research could have been carried out on British patents; it is likely that the same characteristics would emerge.³⁵

Unlike orchil, murexide was invented during the first half of the nineteenth century and industrially produced from 1855 onwards.³⁶ Ten patents were registered in France, all between 1855 and 1859, closely linked to the growing popularity of purple and violet hues. On 12 November 1855, Petersen—a manufacturer of chemical products in Saint-Denis, near Paris—filed patent No. 25388 for a new violet dye process. Petersen gave the name 'murexide' to his colouring matter, significantly, as Perkin would for his 'Tyrian purple'. As a matter of fact, murexide has nothing in common with the Mediterranean purple extracted from various species of murex, since the process involved uric acid and guano.³⁷ This was not the first patent: on 9 July 1855, the Depouilly brothers, chemists in Paris, had filed a patent No. 24089 for an identical process for silk and colours ranging from dark purple to pink. A year later, when a certificate of addition to this first patent was filed, and no doubt because of the competition their invention had generated, the Depouilly brothers gave their invention the trade name of 'purple carmine'. In the meantime, on 14

35 Isabella Whitworth and Zvi Koren, 'Orchil and Tyrian Purple: Two Centuries of Bedfords from Leeds', *Ambix*, 63.3 (2016), 244–67. The authors studied a two-century-old archive relating to a dye manufacturer from Leeds, a major portion of the archive's contents being connected to the trade in orchil.

36 Bommel, de Keijzer, pp. 67–73.

37 'Guano' is a word derived from the Quechua language, designating a material used as a fertilizer, resulting from the accumulation of seabird excrement and corpses in certain areas with a very dry climate.

March 1856, they had filed another patent, No. 26845, entitled 'industrial murexide'. Four other patents for murexide were filed during this period by famous French chemists or entrepreneurs:

- 9 August 1856, Lauth (Strasbourg), chemist, No. 28671; Lauth joined the Depouilly brothers as a chemist in 1857.
- 12 June 1857, Steinbach and Koechlin (Mulhouse), dyers and calico printers, No. 32513.
- 2 September 1857, Steinbach, Koechlin & Co. (Mulhouse), dyers and calico printers, No. 33468.
- 19 August 1857, Schlumberger (Manchester), dyer and calico printer, No. 33928.

As mentioned previously, the chemical process of dyeing became more and more complex, so chemists had started to play an important role in creating dyes.

Synthetic Purples: A European Network (1856–1867).

Held in European public collections, many pieces of clothing, both for women and men, show the exceptional luminosity of the aniline purples discovered during the 1860s. There was a multitude of aniline dyes. As early as the end of 1856, Perkin encountered difficulties due to the lack of fastness of his dye. Perkin was also challenged by François-Emmanuel Verguin (1814–1864), a French chemist established in the city of Lyon, who invented 'fuchsine' in 1858.³⁸ Within a decade, Perkin's and Verguin's discoveries were followed by 110 patents filed either in London or in Paris for synthetic red, purple and violet dyes. Unfortunately, few identifications of the dyes used have been performed on garments. Nonetheless, an exhaustive study of these patents gives a precise account of how Perkin and Verguin launched a European colour-creating competition, which caused a lot of excitement.

Regarding dyeing and calico printing between 1856 and 1867, the

38 Christopher Cooksey and Alan Dronsfield, 'Quirks of dye nomenclature. 4. Fuchsine: four shades of magenta', *Biotechnic & Histochemistry*, 90.4 (2015), 288–93, <https://doi.org/10.3109/10520295.2014.989543>.

chief competition was between Great-Britain and France. Sixty-one patents were submitted only in Britain, fifteen only in France and thirty-four in both Britain and France. Among these thirty-four patents, nineteen were first filed in France. Although the 1791 French law on patents adopted British legal norms, a specific restriction was integrated, which prohibited anyone who had submitted a patent in France from submitting it in another country.³⁹ This restriction was lifted in 1844, and French inventors submitted their patents abroad. It is obvious in the 1860s, when various commercial trials concerning the use of the colour ‘fuchsine’ by the French firm Renard Frères & Franc—to whom Verguin had sold his patent—would encourage the inventors to be very cautious in protecting their discoveries within the field of dyes.

Having been studied in the British Library and in the French National Institute of Industrial Property, the 110 patents have been chronologically listed in a table (Table 10.1).⁴⁰



Table 10.1. Table of patents about aniline purples and violets filed in Britain and France between 1856 and 1867. ©Marie-Anne Sarda, <http://hdl.handle.net/20.500.12434/1cc38c10>

The table entries are the following:

- British/French patent number
- British/French patent date; certificates of addition date
- Applicant’s name
- Patent title
- Colours obtained, as quoted by the applicant

39 7 January 1791: ‘*Loi relative aux découvertes utiles et aux moyens d’en assurer la propriété à ceux qui seront reconnus en être les auteurs*’ [Law concerning useful inventions and means to guaranty their propriety to whom may be considered as their authors]. 25 May 1791: ‘*Loi portant règlement sur la propriété des auteurs d’inventions et découvertes en tout genre d’industrie*’ [Law organizing the inventors’ propriety in any industrial field].

40 London, British Library, Business & IP Centre; Courbevoie, Institut national de la propriété industrielle (INPI). Special thanks to my husband, Pr. Philippe Sarda, who helped me in going through the indexes and the blue and red bindings in the British Library. Many thanks also to Steeve Gallizia, who welcomed me to Courbevoie in the spring of 2023 and taught me how to use the INPI patent database.

As a matter of fact, the rapid diffusion of new dyestuffs technologies at the end of the 1850s and throughout the 1860s was supported by existing networks.⁴¹ Compared with the patents for orchil and murexide, they show an ever-increasing chemical complexity, which reflects the incredible progress of organic chemistry during that period.⁴²

The issues at stake concerned either the colour itself—its intensity, precise shade and fastness—or chemical issues. All inventors had the same aims, such as the recipe yield, the possibility of lowering the cost of aniline, the fixing of dyes on different textile substrates (cotton, wool, silk), their light fastness and their suitability for dyeing and printing. Inventors also shared an extremely empirical methodology. For example, a significant number of patents tried different reagents. Another variant was to try to precipitate the colouring matter before using it for dyeing. A few inventors would explore the range of possibilities for the same compounds at higher temperatures. Lastly, some of them concentrated on developing the mordants needed by the synthetic dyes, as well as specific finishes.

Chromatic Vocabulary

A careful reading of the table (Figure 10.2) shows an increasing interest in the different shades and colour ranges produced. The rapid evolution of the names given by inventors to their patents illustrates this. In 1856, Perkin's patent bore a generic title that placed his new colouring matter in a popular coloured field, 'purple or lilac'. It was only seven years later, in the very first lines of a new patent registered on 6 November 1863 (No. 61129), that Perkin used the words 'mauve', 'mauveine' and 'aniline purple':

L'invention consiste à produire au moyen de la mauvéine (ou base de la matière colorante généralement connue comme mauve ou pourpre d'aniline) ou d'un carbonate ou d'une combinaison faible de cette même base d'autres matières colorantes pourpres de teintes plus rouges et plus bleues.

41 Travis (1993, p. 142) published a very useful graphic diagram showing these relationships, individual trips and technology transfers between Manchester, Paris, London, Lyon and Mulhouse.

42 Bommel, de Keijzer, pp. 145–72.

The invention consists in producing, by means of mauveine (or the base of the colouring matter generally known as mauve or aniline purple) or a carbonate or a weak combination of the same base, other purple colouring matters of redder and bluer hues.⁴³

Perkin's followers quickly coined new names for their inventions to distinguish them scientifically and commercially from one another: 'insidine', 'harmaline', 'fuchsine', 'violine', 'purpurine', 'roseine', 'azaleine', 'crystallineine', 'coralline', 'géranosine' and 'péonine'. All these names carry the suffix -in or -ine, which indicates a link to the substance specified by the prefix. Many refer to a natural resource, such as flowers (fuchsia, rose, azalée, géranium), or to a coloured field (violet, purple, pink). These denominations also explain why, in 1863, Perkin eventually created the name 'mauveine', reminiscent of the flower known as 'mauve'. After a decade of scientific and commercial competition, two French chemists, Charles Girard (1837–1918) and Georges de Laire (1836–1908), invented in 1867 'mauvanine', a light purple colouring matter whose name included both 'mauve' and 'aniline'.⁴⁴

Given in December 1866, the following patent title is finally worthy of note: 'Improvements in the manufacture of artificial colours'.⁴⁵ It was given by Charles Lauth (1836–1913), a chemist from Strasbourg whom has already been mentioned in the context of murexide. Lauth does not create a colour name but mentions 'artificial colours'. What better way to show, after a decade of patents, that the new synthetic dyes no longer had any direct link with nature?

'Magenta'

Whatever the artistic field, the vocabulary of colour is varied. It juxtaposes commercial names with the names given by colour practitioners, painters and craftsmen. In addition, there are vernacular names linked to particular languages or territories, as well as poetic and

43 Courbevoie, INPI, patent No 61129, 6 November 1863.

44 Courbevoie, INPI, patent No 75101, 21 February 1867.

45 Courbevoie, INPI, patent No 73925, 1 December 1866.

literary names. This plurality of the colour vocabulary was reinforced with the advent of aniline colours. Since patents were the first stage in the marketing of any new dye, the commercial name could modify the name given by chemists. In addition, new types of colour terms were introduced during this period, which had other connotations. An interesting example is 'magenta'.

The commercial context of the colour 'magenta', specifically in Britain, has been studied by Charlotte Nicklas, who highlights the importance of middle-class consumers and the growing role of science in nineteenth-century society.⁴⁶ Scientific progress coupled with the idea of modernity that it engendered encouraged the specialist press (clothing and fashion journals) to take up the invention of aniline dyes and to discuss the hues produced. The example of 'magenta' is an exception in that its use in the specialised press seems to have anticipated its adoption by chemists. According to Nicklas, the word 'magenta' appeared in July 1860 in the *Englishwoman's Domestic Magazine*, which stated that the favourite colours for fashionable evening wear were 'the new shades of pink, called Solferino and Magenta'.⁴⁷ During 1860 and 1861, 'magenta' emerged as a fashionable colour, sometimes in association with 'Solferino' and once with 'War Rose'.⁴⁸ 'Magenta' and 'Solferino' were the names of two places where Napoleon III had conducted victorious battles against the Austrian army in northern Italy, dating respectively from 4 and 24 June 1859. The first mention of 'magenta' in scientific publications is the official report published after the 1862 London International Exhibition, which introduced the aniline colours to a larger audience. It is mentioned by Adolphe Wurtz (1817–1884), a French chemist, in his article entitled 'Colouring matters derived from coal tar', as well as by Charles-Auguste Decaux (1817–1898), who was assisting Chevreul in the dyeing workshop at the Gobelins in Paris:

46 Charlotte Nicklas, 'Splendid hues: colour, dyes, everyday science and women's fashion, 1840–1875' (doctoral thesis, University of Brighton, 2009).

47 'The Fashions', *Englishwoman's Domestic Magazine*, New Series, vol. 1 (1860), 141; after Nicklas, *Splendid hues*, p. 259.

48 'The Englishwoman's Conversation', *Englishwoman's Domestic Magazine*, New Series, vol. 2 (1861), 288; after Nicklas, *Splendid Hues*, pp. 261, 300.

M. Verguin, chimiste lyonnais, a obtenu avec l'aniline une nouvelle matière colorante rouge, propre à la teinture, et successivement nommée fuchsine, azaléine, magenta, rosaniline.

Mr Verguin, a chemist from Lyon, has obtained a new red colouring matter with aniline, suitable for dyeing, and successively named fuchsine, azaleine, magenta and rosaniline.⁴⁹

M. Hofmann passe rapidement en revue les principaux industriels qui ont obtenu la matière rouge de l'aniline, aussi appelée fuchsine, en attribuant à M. Verguin, de Lyon, la première préparation industrielle sur une grande échelle, par le perchlorure d'étain. Il cite MM. Simpson, Maule et Nicholson comme ayant donné, en Angleterre, à la production de cette brillante couleur, nommée par eux magenta, un développement qui en fait une industrie à proportions colossales.

Mr Hofmann briefly reviews the main manufacturers who have obtained from aniline the red substance, also known as fuchsine, crediting Mr Verguin of Lyon with the first large-scale industrial preparation using tin perchloride. He cites Mr Simpson, Mr Maule and Mr Nicholson as having given, in England, the production of this brilliant colour, called magenta by them, a development that has made it an industry of colossal proportions.⁵⁰

The following year, Hofmann used the term 'magenta' in the patent he filed in Paris on 11 July 1863. While the title of his patent is fairly broad, 'Improvements in preparing colouring matters for dyeing and printing', Hofmann positioned himself more clearly in the description of his invention:

Je prends la substance bien connue actuellement sous le nom de "Rosaniline" qui est la base obtenue des divers sels de Rosaniline qu'on trouve dans le commerce sous le nom de "Roseine Magenta" ainsi que sous d'autres noms, et que l'on prépare ordinairement avec l'aniline et ses homologues.

I take the substance well known at present under the name of 'Rosaniline' which is the base obtained from the various salts of Rosaniline that are

49 Adolphe Wurtz, 'Matières colorantes dérivées du goudron de houille', in *Exposition universelle de Londres de 1862: rapports des membres de la section française du jury international sur l'ensemble de l'exposition*, ed. by Michel Chevalier (Paris: Imprimeries et librairies centrales des chemins de fer, 1862), p. 279.

50 Charles-Auguste Decaux, 'Couleurs, préparations et teintures', in *ibid.*, pp. 334–35.

found in trade under the name of 'Roseine Magenta' as well as under other names, and usually prepared with aniline and its counterparts.⁵¹

In the same scientific and commercial context, Perkin also used the term 'magenta' in 1864. The title of his patent is the same, and the description of his invention includes a very similar remark:

Je prends la substance connue sous le nom de Rosaniline (la base obtenue des divers sels de Rosaniline et nommée Roseine Magenta et autrement) ou bien un sel basique ou une combinaison faible de la dite base [...].

I take the substance known as 'Rosaniline' (the base obtained from various salts of Rosaniline and called 'Roseine Magenta' and otherwise) or a basic salt or a weak combination of the said base [...].⁵²

According to all these quotations, the colour name 'magenta' appears to be the trade name given by the manufacturers Simpson, Maule & Nicholson to their 'roséine', a colouring matter which in France corresponds to 'fuchsine' (see Figure 10.2). Due to its success, this name quickly became the common name for an aniline dye, shared in Britain by chemists and colourists alike. In France, however, in the context of dyeing and calico printing illustrated above by the archives of the colourists/dyers/chemists of the Koechlin family, the term 'magenta' was never used.⁵³

In 1868–1869, Perkin in Britain, as well as Carl Liebermann (1842–1914) and Carl Graebe (1841–1927) in Germany, made a major contribution to organic chemistry by discovering synthetic alizarin⁵⁴. This discovery launched a new period in the development of synthetic dyes, the new dyes finally overcoming the aniline dyes. However, fuchsine remained a major component for colouring inks, skins, soaps and even wines. At the 1889 Paris World Fair, the term 'magenta' was given indiscriminately to the purple red also known as fuchsine, rosaniline or azaléine.⁵⁵

51 Courbevoie, INPI, patent No 59309, 11.07.1863.

52 Courbevoie, INPI, patent No 64418, 06.09.1864.

53 Darnétal, Archives départementales de Seine-Maritime, fonds Koechlin, 60 J 7.

54 Bommel and de Keijzer, pp. 379–98.

55 Alfred Picard, *Exposition universelle internationale de 1889 à Paris. Rapport général*, vol. VI (Paris: Imprimerie nationale, 1891–1892), p. 221.



Fig. 10.2. Coal Tar Dyes. *Specimens of Fabric Dyed with Messrs. Simpson, Maule & Nicholson's Colours*, c.1865, cotton on card, Bodleian Library, University of Oxford, JJC Soap 1 (41) Recto. ©The Bodleian Libraries, University of Oxford.

Conclusion

Contrary to the legend of Perkin's discovery of mauveine in 1856, the crimson reds, bright purples and vibrant violets using aniline in the 1860s were not created *ex nihilo*. While the scientific innovation of Perkin's invention is indisputable, it has to be examined in its actual context. From the 1840s onwards, in response to demand from the garment industry, dyers, manufacturers and chemists began developing processes to enhance the brilliance of natural purple dyes, as well as their yield and light fastness. Shortly before Perkin's discovery, a new dye was marketed: 'murexide', in reference to the purple of the

murex—a historical reference that Perkin himself would make with the name ‘Tyrian purple’.

The scientific competition which Perkin started is unique in the history of colour. Within a decade, dyers and chemists submitted more than a hundred patents for synthetic purples. Stimulated by considerable scientific as well as commercial issues, vibrant shades enriched an already prolific colour world. To designate the synthetic colours, Perkin, Verguin and their contemporaries had to create colour names. Since they had replaced natural compounds with synthetic ones, inventors often named their dyes after the flowers their colour evoked, by adding the suffix -in/-ine. Other names were connected to the colour itself, using the same suffix. ‘Mauvaniline’ and ‘rosaniline’ emerged as singular examples, mixing ‘mauve’ and ‘rose’ with ‘aniline’, the main synthetic component.

By 1866, chemists progressively abandoned natural colouring materials in favour of ‘artificial’ dyes. The aniline revolution finally overturned a long socio-cultural perception of colours, which had retained an ancient and intimate link with nature. Marketed successfully in 1860 by the British supplier Simpson, Maule & Nicholson, ‘magenta’ became the symbol of this profound change. Linked to neither a natural material nor a dyeing process, ‘magenta’ still exists and designates the primary red.

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11. The Hayters and the Controversy on Colour¹

Giulia Simonini

Introduction

In the 1820s, Charles Hayter (1761–1835), a miniature painter and Professor of Perspective and Drawing to Princess Charlotte of Wales (1796–1817), supported in three publications the colour theory known as the trichromacy of colour mixture.² This theory had surfaced in philosophical writings toward the end of the sixteenth century, and its

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- 1 This chapter could not have been written without the help of many colleagues. I owe my deepest gratitude to Paul Smith (University of Warwick) for having shared with me much of his knowledge and material on the Hayters; to V.E. Mandrij (University of Konstanz) for having provided scans of some of Charles Hayter's books which were otherwise inaccessible to me; to Friedrich Steinle (Technische Universität Berlin) for his wise comments on early nineteenth-century colour theories; and to Joyce Dixon for her precious feedback.
 - 2 This phrase has been introduced by John Dixon Mollon, 'The Origins of Modern Color Science', in *The Science of Color*, ed. by Steven K. Shevell (Washington: Optical Society of America, 2003), pp. 1–37 (p. 5). I discuss this theory in other publications. See, for instance, Giulia Simonini and Friedrich Steinle, 'Pure Red. The Evolution of a Colour Idea in Trichromacy', in *Kritische Berichte*, 1- Phänomen 'Farbe'. Ästhetik-Epistemologie-Politik, ed. by Hana Gründler, Franziska Lampe and Katharine Stahlbuhk (2022), pp. 12–21; Giulia Simonini, 'James David Forbes' Mayerian Triangle (1848–49) and the Enamels at the Studio Del Mosaico Vaticano', in *Colors and Cultures. Interdisciplinary Explorations/Couleurs et Cultures. Explorations Interdisciplinaires*, ed. by Sämi Ludwig, Astrid Starck-Adler, and André Karliczek (Jena: Salana, 2022), pp. 248–67; Giulia Simonini, 'Calau's Punic Wax, Lambert's Farbenpyramide (1772), and Prefabricated Watercolour Cakes', in *Ordering Colours in 18th and Early 19th Century Europe*, ed. by Tanja Kleinwächter, Sarah Lowengard and Friedrich Steinle, *International Archives of the History of Ideas*, 244 (London: Springer Nature, 2023), pp. 119–49.

supporters postulated the existence of three main chromatic colours (red, yellow and blue) which, when mixed, could yield all others. Trichromacy was commonly believed to work for both spectral colours and paints and, since its postulation, had allowed for the development of diagrammatical representations of colour mixing. Hayter likewise represented trichromacy with several colour-mixing diagrams, one of which was eternalised in a painting by Charles's younger son John Hayter (1800–1895), entitled *Portraits of Hayter, Senior, and Three Young Artists* (Figure 11.1). John's painting was exhibited at the 55th Exhibition of the Royal Academy of Arts in 1823, thereby officially celebrating his father's authority within contemporary discussions of colour theory. This painting is almost unique in its genre, as it depicts Charles's colour diagram at the centre of the composition. Yet the meaning and content of this painting came to be regarded as controversial for various reasons, ultimately leading to a change in the painting's title in 1917.



Fig. 11.1. John Hayter, *Portraits of Hayter, Senior, and Three Young Artists* or *A Controversy on Colour* or *Portraits of Charles Hayter and Three Young Artists*, 1823, oil on canvas, 112.1 x 143 cm, Shipley Art Gallery, Gateshead.

In this chapter, I explore the motives that occasioned such a controversial turn and I also situate Charles's understanding of colour mixing within the evolution of trichromatic theory in the eighteenth and nineteenth centuries. In particular, I demonstrate two things. First, how Charles appropriated an older colour scheme and claimed it as his own invention. Second, how the material and optical uniformity of trichromacy that Hayter's publications supported until the middle of the nineteenth century was finally questioned by new discoveries in optical physics made in the second half of the century.

The Painting

John Hayter's painting shows three men sitting around a table. Behind the old man on the left of the painting stands a young man. He is probably in his twenties, holds a painter's palette in his left hand and is gazing at the viewer. In the background, the scene is framed by a column on the left and a red curtain waving in the wind on the right. Beyond the frame, a cloudy blue sky is visible.

In the catalogue of the 55th Exhibition of the Royal Academy of Arts that took place in 1823, John Hayter's painting is entitled *Portraits of Hayter, Senior, and Three Young Artists*.³ This painting is now held at the Shipley Art Gallery in Gateshead and is recorded on their website with the title *A Controversy on Colour or Portraits of Charles Hayter and Three Young Artists*.⁴ Both titles attest that John's father Charles, the old man wearing a beret and spectacles, is the primary figure of the painting. With the index finger of his right hand, Charles points to a glass prism he holds in his left hand. Charles is looking at the man with the long sideburns on the opposite side of the table, who is finely dressed in a black suit and a black-violet silk scarf. This other figure, possibly in his thirties, points with his finger to a colour scheme painted in a notebook. With the other hand, he holds a large sheet of paper which he may have just turned upside down. His gaze is directed at Charles. The centre of

3 *The exhibition of the Royal Academy, MDCCCXXIII. The fifty-fifth* (London: McMillan, 1823), p. 4 (no. 23).

4 The Shipley Art Gallery, Search collection (Tyne & Wear archives & museums, Gateshead Council, 2024), <https://collectionssearchtwmuseums.org.uk/#details=ecatalogue.304642>.

the composition shows a younger man with reddish-blond hair, who seems to be scribbling or drawing in a notebook using a pencil extender.

An inscription on the back of the painting identifies the three other persons in the painting as the painter of animals Edwin Landseer (1802–1873), the genre painter William Mulready (1786–1863) and the marine and landscape painter Clarkson Frederick Stanfield (1793–1867). They were all colleagues and friends of John Hayter and of his brother George (1792–1871), who was eight years older than John and much better known and who was later Principal Painter in Ordinary to Queen Victoria (1819–1901).⁵ Barbara Coffey Bryant has instead identified the ‘three young artists’ as Landseer, George Hayter (the man standing with the painter’s palette) and John Hayter (the man sitting opposite to Charles).⁶ While I do agree that the scene depicts Landseer and the three Hayters, I contend that George is the sitter looking at Charles, while John is the painter standing with the palette in his hand.⁷ As the author of the painting, it makes sense that John depicted himself holding a painter’s palette. Furthermore, he looks younger than the man on the right, which would match the age difference of the two brothers.

John is also the only one standing and seemingly not taking part in the conversation. Indeed, he is staring at us, almost as if to invite us to pay attention to what is going on in the painting. Many painters have used this device for this very purpose. In *The Four Philosophers*, for example, Peter Paul Rubens (1577–1640) painted himself as the man standing and fixing his gaze on the viewer.⁸ The other three men in the scene sit at a table full of objects, which represents scholarship, and the painting is a

5 The inscription reads ‘Portraits of Hayter with prism demonstrating laws of colour to Landseer, Mulready and Clarkson Stanfield. Painted by HAYTER’. *Ibid.* In 1823, Landseer, Mulready and Stanfield were twenty-one, thirty-seven and thirty years old, respectively. None of the ‘three young artists’ looks as if he were almost forty years old, so the identification of Mulready is certainly wrong.

6 *An Exhibition of Drawings by Sir George Hayter, 1792-1871 & John Hayter, 1800-1895*: [27 October–26 November, 1982], ed. by Barbara Coffey and David Alexander (London: M. Morris, 1982), p. 19.

7 This identification was also proposed by the art historian and curator of the Palace of Westminster Richard John Boileau Walker in 1979, as one can deduce from a letter by John Millard, the former curator of the Shipley Art Gallery. Millard, John, letter to Richard Walker, 16 October 1979. Unpublished manuscript, Notes on Sitters (Charles Hayter), NPG Archive, National Portrait Gallery, London. I am grateful to Professor Paul Smith for sharing a copy of this letter with me.

8 Florence, Palazzo Pitti, 1611–1612. For the image, see https://en.wikipedia.org/wiki/The_Four_Philosophers#/media/File:Peter_Paul_Rubens_118.jpg.

complex statement of Rubens's ideas about neostoicism.⁹ Similarly, the table full of objects in John Hayter's painting—books, a portable drawing desk, a divider, a glass prism, a pencil extender and a painter's palette—points to Charles Hayter's involvement in contemporary discussions about colour mixing and colour theory. The inscription on the back of the painting furthermore stresses that the painting portrays '[Charles] Hayter with prism demonstrating laws of colour'.¹⁰ Additionally, at the centre of the composition is the notebook open on a page displaying Charles Hayter's colour-mixing diagram, which we will now consider.

The Colour Mixing Diagram

George is pointing with the index finger of his right hand to the diagram painted in the notebook. Above the diagram, an inscription reads 'Ch[arles] Hayter's diagram', thus ascribing the authorship of this design to Hayter senior. Charles and George seem to be the only ones having a conversation about the meaning of the diagram, as Charles holds the glass prism and shows it to his son. A similar discussion might have taken place at some point between the two Hayters, since both published similar colour-mixing diagrams in the 1820s. The diagram in John's painting was published in three of Charles's books, while George devised a colour diagram for the catalogue of heaths collected by John Russell, sixth Duke of Bedford (1766–1839).¹¹

Charles's colour-mixing diagram appeared for the first time in 1810 in the frontispiece of the anonymously published *The Painter's Primer*. The diagram is uncoloured but shows the names of the colours inside the circles. The image is captioned 'The first mixture of the 3 primitive Colors' and is then explained in rhyme as follows: 'Then comes gay Iris with delightful hues, presenting ev'ry colour you can choose: The primitive (or master) colours are, red, blue, and yellow, ev'ry tint they bear. By them we purple, orange, green, produce, and every colour

9 Mark P.O. Morford, *Stoics and Neostoics: Rubens and the Circle of Lipsius*, Princeton Legacy Library, 5015 (Princeton: Princeton University Press, 2017), pp. 3–5.

10 See footnote 5 above.

11 John Russell and George Sinclair, *Hortus Ericæus Woburnensis: Or, A Catalogue Of Heaths, In the Collection of The Duke Of Bedford, At Woburn Abbey: Alphabetically And Systematically Arranged* (London: J. Moyes, 1825); Giulia Simonini, 'Syme's Colour Chart in Botany: Origin and Impact', in *Nature's Palette. A Colour Reference System from the Natural World.*, ed. by Patrick Baty (London: Thames & Hudson, 2021), pp. 172–89 (pp. 186–87).

which you want for use'.¹² The diagram reappeared in 1813 in Charles's *An Introduction to Perspective, Adapted to the Capacities of Youth, in a Series of Pleasing and Familiar Dialogues Between the Author's Children*: a handbook for children and young people about how to draw perspective. Charles's book was quite successful and ran in five editions between 1813 and 1845, the last of which was published posthumously and illustrated with lithographs by Owen Jones (1809–1874).¹³ *An Introduction to Perspective* is divided into two main sections, the first dedicated to perspective and the second dedicated to drawing, painting and colouring. The first section is developed as a dialogue among Charles's children: George, Ann (1795–1854), Eliza (1796–d. before 1823) and John. George, as the eldest, answers the questions of his three siblings.¹⁴

The second section is comprised of twenty-one letters that Charles addressed to an unidentified Madame B. Letter sixteen deals with colour theory, and in it, Charles explained that 'there are but three primitive colours—red, yellow, and blue—which, by mixing half of each two colours together, will produce three more—purple, orange, and green'.¹⁵ Charles then added that 'a proper quantity of each of the three first colours will compose black'.¹⁶

To this letter, Charles attached Plate 14 in which, under 'FIG. 3', an uncoloured diagram can be seen consisting of three circles that intersect with each other (Figure 11.2). Although the scheme is shown in black-and-white, it is evidently the same diagram that features in John's painting. The scheme served, among others displayed in the plate, to demonstrate that by hand-colouring, the reader would be able to understand and agree with the primacy of red, yellow and blue in Charles's colour-mixing

12 Charles Hayter, *The Painter's Primer; in Rhyme, by an Experienced Artist* (Oxford: printed by N. Bliss for Messrs. Macgavin, London, 1810), p. 28.

13 Charles Hayter, *An Introduction to Perspective: Practical Geometry, Drawing and Painting; New and Perfect Explanation of the Mixture of Colours; with Practical Instructions for Miniature, Crayon, and Oil Painting; in a Series of Familiar Dialogues between the Author's Children and Letters Addressed to His Pupils. Illustrated with Numerous Wood Engravings, From Drawings by John Hayter, Esq. and Coloured Plates* (London: Samuel Bagster and Sons, 1845), p. xiv.

14 James Bettley, 'Ann Hayter', *Totham1821. A Celebration of Great Totham in the 1820s* (2014), <https://totham1821.wordpress.com/tag/ann-hayter/>.

15 Charles Hayter, *An Introduction to Perspective, Adapted to the Capacities of Youth, in a Series of Pleasing and Familiar Dialogues between the Author's Children. Accompanied with Illustrative Plates, Appropriate Diagrams, and a Sufficiency of Practical Geometry. To Which Is Added, a Compendium of Genuine Instruction in the Art of Drawing and Painting [Entitled Letters on Drawing and Painting]* (London: printed for the author, 60, Wells-street, Oxford-street, and sold by Black, Parry, and Co., 1813), p. 137.

16 *Ibid.*

theory. Indeed, Charles instructed readers to 'cover one whole circle with yellow, another red, and the other with blue (letting each dry before you lay the next). The colours intermixing by the equilateral intersection of the three circles, will produce orange, green, and purple; and the central portion, taking all the three colours, will be neutral of the black class'.¹⁷

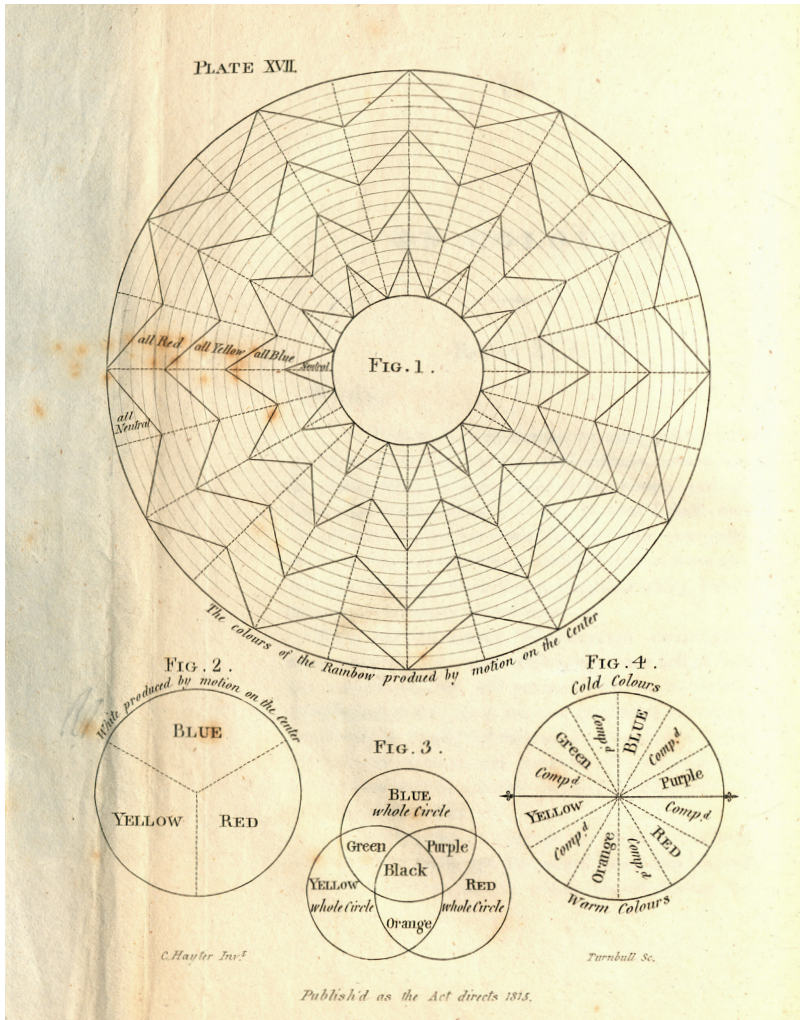


Fig. 11.2. Plate 16 of Charles Hayter's *Introduction to Perspective* (1815) = Plate 14 of Charles Hayter's *Introduction to Perspective* (1813), showing the original scheme ('FIG. 3'), the regular compass ('FIG. 4') and the two schemes for optical-mixing experiments. Stadtbibliothek Wintertur, Farbsammlung Werner Spillmann, FWS_S_1815_HAYT # 852348.

17 Hayter, *An Introduction to Perspective* (1813), p. 139.

In the 1825 edition, two years after the diagram had appeared in John's painting, Plate 14 became Plate 20 and was slightly modified. Charles moved 'FIG. 2' to the centre of 'FIG. 1', a large diagram showing, according to Charles, the colours of the rainbow. With this adaptation, he could obtain enough space to add 'FIG. 5', which is an enhancement of the first scheme, here represented under 'FIG. 3' and called 'original 1810'. In 'FIG. 5', captioned 'ultimatum 1824', next to the three primaries are orange, purple, green and black, along with three further mixtures: brown, olive and slate. Charles elucidated the reasons for enhancing the original scheme:

But although figure 3, gives more information on the manner by which the three primitives generate the orange, green, and purple, than any other diagram that I know of, still the three neutral tints which descend from the equal mixtures of the orange, green, and purple, required the construction of the figure No. 5 [...] I cannot think myself presumptuous in naming that diagram Ultimatum.¹⁸

A third diagram needs our attention now, namely 'FIG. 4' on Plate 20. This diagram is a circle subdivided into twelve equal wedges, representing the three primitives and their three mixtures as well as the mixtures of yellow with green, green with blue, blue with purple, purple with red, red with orange and orange with yellow. This diagram had already appeared in the first edition of *An Introduction to Perspective* (see Figure 11.2). Charles explained that by colouring this diagram, 'you have a regular compass of all major colours and tints, whereby you may see their dependence on one another'.¹⁹

In 1826, Charles merged this 'regular compass' with the original scheme, adopting some minor changes. The superposing of these two diagrams was then published in *A New Practical Treatise on the Three Primitive Colours, Assumed as a Perfect System of Rudimental Information*. In this book, Charles called his original scheme 'The Equilateral Union of

18 Charles Hayter, *An Introduction to Perspective, Drawing, and Painting in a Series of Pleasing and Familiar Dialogues between the Author's Children: Illustrated by Appropriate Plates and Diagrams, and a Sufficiency of Practical Geometry, and a Compendium of Genuine Instruction ...* /, 4th edn (London: printed for Kingsbury, Parbury, and Allen, 1825), pp. 230–31. For the image, see <https://babel.hathitrust.org/cgi/pt?id=gri.ark:/13960/t57d6kn47&seq=298>.

19 Hayter, *An Introduction to Perspective* (1813), p. 140.

the three Circles' or 'equilateral intersection of the three equal circles'²⁰ and represented it with different colours at the centre of three colour circles, each subdivided into three rings showing three degrees of brightness of the colours illustrated therein. Plate 2 illustrating these three colour systems is entitled 'Painter's Compass'.²¹ The first circle displays the three primitive colours and those engendered by their mixing. It is subdivided into eighteen wedges. Colour names, such as 'green', 'green blue' and 'blue green', are provided around the circle. As the name of the diagram duly suggests, this naming system reflects the naming system for cardinal directions on a compass rose. The second circle is subdivided into twelve sections only and represents colours yielded by mixing orange, green and purple with one another. These are called 'brown', 'olive' and 'slate', together with the composite names thereof. Finally, the third circle takes brown, olive and slate as its central colours and displays only three of their mixtures, called 'olive brown', 'slate brown' and 'olive slate'. With the exception of the frontispiece of *The Painter's Primer* (1810), which only bears the inscription 'invented and drawn by the author', all other plates are signed as 'C. Hayter inv.' (i.e. Charles Hayter *invenit*), thus crediting Charles for their invention.²² However, some of Hayter's contemporaries did not fully agree with his claim to authorship of the diagram, fuelling a controversy around the originality of Hayter's diagram, as we shall now see.

Originality of the Diagram

In the first edition of *An Introduction to Perspective* (1813), Charles proudly stated of his colour mixing diagram that 'this scheme is my own'.²³ Similarly, John emphasised his father's authorship of the diagram by labelling it in his painting 'Ch. Hayter's Diagram'. In the 1825 edition

20 Charles Hayter, *A New Practical Treatise on the Three Primitive Colours, Assumed as a Perfect System of Rudimental Information ... With Some Practical Rules for Reflections; and Sir Isaac Newton's Distribution of the Colours in the Rainbow* (London: John Booth, 1826), pp. 10, 16.

21 In the book, however, he treats each circular diagram as a single compass and names them altogether as 'compasses'. Hayter, *Three Primitive Colours*, pp. 10, 22, 29, 30. For the image, see <https://archive.org/details/newpracticaltrea00hayt/page/n27/mode/1up>.

22 Hayter, *The Painter's Primer*, frontispiece.

23 Hayter, *An Introduction to Perspective* (1813), p. 139.

of *An Introduction to Perspective*, Charles again stressed that the two diagrams, the 'original' and the 'ultimatum', were his own inventions.²⁴ Likewise, in the preface to *A New Practical Treatise on the Three Primitive Colours*, Hayter underscored once again the 'originality [...] of my new rudimental diagrams',²⁵ and furthermore elucidated that he had designed this scheme for 'a small rudimental book in 1810'. Geert-Jan Koot and Paul Smith have correctly argued that this rudimental book is the anonymously published *The Painter's Primer*, in which this very scheme appears in the frontispiece.²⁶

In 1813, when the first edition of *An Introduction to Perspective* was released, the similarities of his first diagram with an earlier colour system were immediately noticed and pointed out to him. Charles explained that in 1813:

a work by Moses Harris (WHICH I HAD NEVER BEFORE SEEN OR HEARD OF) was brought to me, to dash my claim to the originality of my diagrams. But although we have accidentally thought somewhat alike [...] I [...] must confess, that at the time I felt no undue degree of triumph over my proffered antagonist, which I presume is fairly maintained by comparing the rudimental centre of his circular display.²⁷

Moses Harris (1731–1785) was a miniature painter and entomologist who authored the successful *An Exposition of English Insects* (1776), which included a colour scheme showing the colour names used to describe the specimens.²⁸ However, the book by Harris, which was brought to Charles in 1813, was in all likelihood the second edition of another of his books, *The Natural System of Colours*, as there existed very few copies of

24 Hayter, *An Introduction to Perspective* (1825), p. 230.

25 Hayter, *Three Primitive Colours*, p. 10.

26 Geert-Jan Koot, 'Selectie aanwinsten oktober 2018', *The Art of Information* (Research Service Department Rijksmuseum, 2018), <https://theartofinformationblog.wordpress.com/selectie-aanwinsten-oktober-2018/>; Paul Smith, 'Big in Japan: George Field, Aristotle, and the Colour Diagram as Moveable Feast', forthcoming.

27 Hayter, *Three Primitive Colours*, p. 10.

28 Moses Harris, *An Exposition of English Insects: With Curious Observations and Remarks, wherein Each Insect is Particularly Described; Its Parts and Properties Considered; the Different Sexes Distinguished, and the Natural History Faithfully Related: the Whole Illustrated with Copper Plates* (London: printed for the author and sold by Messrs. Robson and Co. ... and Messrs. Dilly, 1776 [1780]), pp. iv–viii. See also Giulia Simonini, *Color Charts in 18th-century Europe: Natural, Pigmentary, and Trichromatic* (Heidelberg: arthistoricum.net, 2025), pp. 388–89.

the first edition, dating to c.1781.²⁹ The second edition of Harris's book was edited and published in 1811 by Thomas Martyn (fl. 1779–1811), natural history dealer, collector and author of *The Universal Conchologist* (1784–1787). In the 'address' to the reader, Martyn praised Harris for his 'comprehensive mind, and superior genius in his profession' and published the book as his 'lasting memorial'.³⁰

In *The Natural System of Colours*, Harris inserted two colour systems, one called 'Prismatic' and one called 'Compound', explaining the same colour theory that Charles later supported. The first system shows a circular scheme comprised of eighteen sections, which illustrate the three primitive colours (red, yellow and blue), their three compounds (orange, green and purple) and a further two compounds between each primitive and compound, named, for example, 'blue-purple', 'purple-blue', etc. Inside the circle, Harris placed three equilateral triangles coloured with his primitives which create a fourth equilateral triangle by overlapping on one corner. According to Harris's colour-mixing rules, this fourth triangle would turn black. The compound system follows an identical scheme, but it shows the three main compounds, three secondary compounds obtained by their mixture ('brown', 'slate' and 'olive' [sic]) as well as two further compounds between one main compound and one secondary compound, named for instance 'brown purple' and 'purple brown'. This scheme also has at its centre three equilateral triangles producing a black one, though this time the triangles are coloured with the main compounds.³¹

A closer look at Harris's systems reveals an evident similarity with Hayter's compasses. Not only does the subdivision of the prismatic circle into eighteen sections coincide with that of the first compass, but even Harris's peculiar terms 'olive' and 'slate' for the secondary compounds were adopted in Charles's second and third compasses. Finally, Charles's

29 For the dating, see Simonini, *Color Charts in 18th-century Europe*, pp. 387–88.

30 Moses Harris, *Natural System of Colours, etc.*, 2nd edn, ed. by Thomas Martyn (London: printed at Laidler's officer, Princes-Street, Leicester-Fields, 1811), p. i.

31 Moses Harris, *The Natural System of Colours Wherein is Displayed the Regular and Beautiful Order and Arrangement, Arising from the Three Premittives, Red, Blue, and Yellow, The Manner in Which Each Colour Is Formed, and its Composition, the Dependance they Have on Each Other, and by their Harmonious Connections Are Produced the Teints, or Colours, of Every Object in the Creation, and Those Teints, tho' so Numerous as 660, Are All Comprised in Thirty Three Terms, only* (London: Laidler's Office, Princes-street, Leicester-Fields, 1781), pp. 5–6.

'Equilateral Union of the three Circles' undeniably recalls Harris's superposed triangles. Moreover, the term 'equilateral', used by Charles to describe the circles forming this diagram, is misused, as, in geometry, 'equilateral' defines a triangle with three sides of the same length. This misuse seems to corroborate the likelihood that Hayter used Harris's scheme as a template to develop his own diagram.

Since the original diagram was the one for which Charles was suspected of plagiarism in 1813, it was extremely convenient for him to date the invention of his scheme to 1810, the year prior to the release of the second edition of Harris's *The Natural System of Colours*. Moreover, Charles offered his defence only in 1826, when he first published, in Plate 20, the 'regular compass' merged with the original scheme, which was clearly inspired by Harris's work.³²

As previously mentioned, a rudimentary form of the compass had already appeared in 1813 and was named by Charles 'a regular compass'. This circle, however, clearly differs from the 1826 compasses: it is subdivided into twelve sections and shows no colour names for the tertiaries olive, brown and slate. Hence, whoever brought Harris's second edition of *The Natural System of Colours* to Charles clearly helped him develop his later 'Painter's Compass[es]'.

That the Hayters started to appreciate Harris's work after 1813 is also evident from another reinterpretation of it. In the 1820s, Charles's oldest son George was asked by John Russell to produce a diagram showing readers the colour terms discussed in *Hortus ericæus woburnensis* (1825). George recounts the alleged genesis of his 'Diagram of Colours' in a letter he wrote to Russell in December 1824 that was published as an appendix to Russell's book. George imagined that 'a scale might be made according with the scientific arrangement proposed by my father in his Work on Perspective, page 212, in which they might each find a corresponding tint'.³³ The arrangement mentioned by George is the

32 Hayter, *Three Primitive Colours*, p. 10.

33 Russell and Sinclair, *Hortus Ericæus Woburnensis*, p. 40. Here, George refers to the third edition of Charles Hayter, *An Introduction to Perspective, Drawing, and Painting in a Series of Pleasing and Familiar Dialogues between the Author's Children: Illustrated by Appropriate Plates and Diagrams, and a Sufficiency of Practical Geometry, and a Compendium of Genuine Instruction ...*, 3rd edn (London: printed for Black, Kingsbury, Parbury, and Allen, 1820), p. 212, where Charles describes the diagram. The digitised diagram can be seen here: <https://collections.britishart.yale.edu/catalog/alma:9959761633408651>.

'Equilateral union of the three Circles', hence the same diagram that is visible in John's painting.³⁴ The diagram George designed for Russell is very much in line with Charles's first circle in the 'Painter's Compass' plate published one year later.

George's diagram displayed orange as the uppermost colour and then follows his father's chromatic sequence. However, George omitted the conjoined circles from the centre and subdivided his diagram of colours into thirty sections and ten rings. The ten concentric rings mirror those of the prismatic and compound circles in Harris's *The Natural System of Colours*. Furthermore, George established a colour nomenclature that reflected Harris's naming strategy. He declared that he had formed his scheme 'upon that of the Mariner's Compass' because he used the initials of the three primitives and three compounds to define the colours in the circle.³⁵

Thanks to the second edition, Harris's work on colour started to circulate among British painter-academic circles and was studied by practitioners and scholars. Harris's colour system was mentioned in George Field's (1777–1854) *Chromatics, or, An Essay on the Analogy and Harmony of Colours* (1817) and partly copied by William Turner (1775–1851) for a lecture at the Royal Academy of Arts in 1825.³⁶ Consequently, in the 1820s, Hayter felt compelled to prove that his colour diagrams were his original inventions and used every possible means, including his son's painting, for this purpose. However, it may well be that the painting was renamed for another reason, as we shall now see.

34 Indeed, this arrangement was published in all four editions of *An Introduction to Perspective* (1813, 1815, 1820 and 1825, respectively), whereas the compasses only appear for the first time in Charles Hayter's *Three Primitive Colours* (1826).

35 Russell and Sinclair, *Hortus Ericæus Woburnensis*, pp. 40–41.

36 George Field, *Chromatics, or, An Essay on the Analogy and Harmony of Colours* (London: printed for the author by A.J. Valpy, Tooke's Court, Chancery Lane, and sold by Mr. Newman, Soho Square, 1817), p. vii. Field was informed about this book by Charles Taylor, the secretary of the Society of Arts. See John Gage, 'A Romantic Colourman: George Field and British Art', *The Volume of the Walpole Society*, 63 (2001), 1–73 (p. 9). John Gage, *Colour in Turner: Poetry and Truth* (London: Studio Vista, 1969), pp. 115–16; John Gage, *J.M.W. Turner. A Wonderful Range of Mind* (New Haven: Yale University Press, 1987), pp. 75–76; John Gage, *Colour and Culture. Practice and Meaning from Antiquity to Abstraction* (London: Thames and Hudson, 1994), p. 203.

The Controversy on Colour

As previously explained, John's painting is today known as *A Controversy on Colour or Portraits of Charles Hayter and Three Young Artists*. Yet the original title of the artwork, *Portraits of Hayter, Senior, and Three Young Artists*, does not suggest that there is a controversy occurring in the painting. The 1917 catalogue for the opening of the Shipley Art Gallery—named for local solicitor and art collector Joseph Shipley (1822–1909)—where the painting is now held is the first textual source citing this title.³⁷ The author of the new title was Matthew Young, first curator of the Shipley Art Gallery and Joseph Shipley's clerk. I contend that the reason for this change of title may reside in the philosophical controversy between Hayter's understanding of trichromatic colour mixing and the new discoveries in colour science made at the end of the nineteenth century.

The controversy hinted at in the title is represented by the triad of objects aligned along an imaginary vertical line on the painting. This line connects the colour diagram, the glass prism and the painter's palette. These objects effectively summarise the widespread early nineteenth-century belief about how coloured light mixed with pigments. The confusion was notably started by Isaac Newton (1643–1727) in *Opticks* (1704), in which the philosopher demonstrated that white light is composed of seven primary colours but then attempted to produce white by mixing the coloured powders 'which Painters use'.³⁸ Some philosophers and painters were confused by Newton's thesis and supposed that his theory of colour could be simplified by reducing the seven primaries to the triad red, yellow and blue. Others, in a fully anti-Newtonian spirit, continued to believe that there were only three fundamental colours

37 Many thanks to Professor Paul Smith for pointing out this source to me. The catalogue has not survived, but this information can be found in Millard's letter to Walker. See footnote 7 above.

38 Isaac Newton, *Opticks or, A treatise of the reflections, refractions, inflections and colours of light; also two treatises of the species and magnitude of curvilinear figures* (London: printed for Smith and Walford, 1704), p. 110; Paul D. Schweizer, 'John Constable, Rainbow Science, and English Color Theory', *The Art Bulletin*, 64.3 (1982), 424–45; Alan E. Shapiro, 'Artists' Colors and Newton's Colors', *Isis*, 85.4 (1994), 600–30; John Gage, 'Signs of Disharmony: Newton's Opticks and the Artists', *Perspectives on Science*, 16.4 (2008), pp. 360–77; Giulia Simonini, 'From Experiments to Figuration. Pigment Powders, Newton's Colour Wheel and *Traité de la Peinture au Pastel*', *Lumières*, 43. Dossier: *Un monde de couleurs. Représentations chromatiques au XVIIIe siècle*.1 (2024), 71–103.

(red, yellow and blue) that could engender all others as had often been postulated since the late sixteenth century.³⁹ The triad of primary colours was considered valid not only for pigments, but also for coloured light, and we call it 'trichromacy of colour mixture' or simply 'trichromacy'.

While these ideas were already tacitly represented in 1708 in the first adaptation of Newton's colour wheel for painters,⁴⁰ the theory was disseminated in continental Europe thanks to the work of the Jesuit Louis Bertrand Castel (1688–1757) in 1740. Trichromacy gained approval in the British Isles only towards the end of the eighteenth century through the works of a number of colour theorists, including for example George Palmer's (pseudonym for George Giros de Gentilly, c.1746–1826) *Theory of Colors and Vision* (1777), Harris's *The Natural System of Colours* (c.1781), and Edward Bancroft's (1745–1821) *Experimental Researches concerning the Philosophy of Permanent Colours* (1794).⁴¹ It continued to gather supporters in the nineteenth century. By then the theory had become such a consensus that many English colour theorists clearly mashed up trichromacy with Newtonian colour theory. One authoritative example in this respect was Thomas Young (1773–1829), who in his 1801 Bakerian Lecture proposed a theory of three-colour vision contending that Newton 'was in reality the first that suggested such a theory'.⁴² Young supposed that light moved with undulations and that the human retina had just three principal colour receptors for the colours red, yellow and blue.⁴³ In 1802, Young changed the principal colours to red, green and violet thanks to William Hyde Wollaston's (1766–1828) experiments on spectral colours. Wollaston, however, observed four primaries: 'red, yellowish green, blue, and violet'.⁴⁴ Young's amendment of his principal colour

39 Eileen Reeves, 'The New Sciences and the Visual Arts', in *A Companion to Renaissance and Baroque Art*, ed. by Babette Bohn and James M. Saslow (John Wiley & Sons, 2013), pp. 316–35 (p. 326).

40 Simonini, 'From Experiments to Figuration', pp. 94–101.

41 On Palmer, see Rolf Kuehni, 'Talking about Color ... Which George Palmer?', *Color Research & Application*, 34.1 (2009), 2–5. On Bancroft, see Gage, 'A Romantic Colourman', p. 2.

42 Thomas Young, 'The Bakerian Lecture: On the Theory of Light and Colours', *Philosophical Transactions of the Royal Society of London*, 92 (1802), 12–48 (p. 13). A similar hypothesis had been proposed by Giros de Gentilly in 1777, see footnote 41 above.

43 Young, 'On the Theory of Light and Colours', p. 21.

44 Thomas Young, 'XIV. An Account of Some Cases of the Production of Colours, Not Hitherto Described', *Philosophical Transactions of the Royal Society of London*, 92

was likely ignored by other theorists who supported the existence of a universal theory of colour that worked for both light and paint mixtures. Indeed, it should be noted that one cannot obtain blue, yellow and orange by mixing red, green and violet paints.

This universal trichromatic theory was clearly heralded in the titles of books mostly discussing paint mixing and some optical observations, for example, the inverted spectrum or optical mixing. One of the first English accounts of this sort is James Sowerby's (1757–1822) *A New Elucidation of Colours, Original, Prismatic, and Material: Showing Their Concordance in Three Primitives, Yellow, Red, and Blue, and the Means of Producing, Measuring, and Mixing Them: With Some Observations on the Accuracy of Sir Isaac Newton* (1809). Charles Hayter's publications belonged to this genre. In his 1826 book fully dedicated to colour theory, Hayter's trichromatic ideas are clearly expounded in the title: *A New Practical Treatise on the Three Primitive Colours, Assumed as a Perfect System of Rudimental Information ... With Some Practical Rules for Reflections; and Sir Isaac Newton's Distribution of the Colours in the Rainbow*. We can see that Charles had been made aware of Young's theory of colours, as he briefly mentioned the discoveries of transient colours made by 'Sir I. Newton, Dr Young, etc.' in this book.⁴⁵ In the introduction, Charles maintained that an explanation of the natural relationship of colours 'was still wanting to distinguish between the practical properties of such materials as give their colours in substances, suitable to the purposes of art; and the transient effects of light, which must not be considered as belonging to the system of mixing colours for the purpose of painting'.⁴⁶ For this reason, he claimed to treat 'the properties of the painting materials' only.⁴⁷

Yet, at the beginning of his book, he also stated that 'the Supreme Power of Light' established the primacy of red, yellow and blue in colour

(1802), 387–97 (p. 395); Andrew Robinson, *The Last Man Who Knew Everything: Thomas Young, the Anonymous Polymath Who Proved Newton Wrong, Explained How We See, Cured the Sick, and Deciphered the Rosetta Stone, Among Other Feats of Genius (Revised Edition)* (Cambridge: Open Book Publishers, 2023), p. 71; William Hyde Wollaston, 'XII. A Method of Examining Refractive and Dispersive Powers, by Prismatic Reflection', *Philosophical Transactions of the Royal Society of London*, 92 (1802), 365–80 (p. 378); E.C. Millington, 'History of the Young-Helmholtz Theory of Colour Vision', *Annals of Science*, 5.2 (1942), 167–76 (p. 169).

45 Hayter, *Three Primitive Colours*, p. 11.

46 *Ibid.*, p. 6.

47 *Ibid.*

mixing.⁴⁸ Moreover, in the description of the colour-mixing diagram, he argued that 'The Painter's Compass [...] will explain the order of their [the colours'] expansion towards light',⁴⁹ and we can see that the colours in the compass transition to white towards the external part of the diagram. Moreover, in this book, Charles included two experiments that he had already described in the first edition of *An Introduction to Perspective*.⁵⁰ The first was well expounded in the 1813 edition, while it is barely discussed in 1826. The experiment served to demonstrate that red, yellow and blue produce white light when optically mixed, and thus that these three colours could also be regarded as primaries of light. In *An Introduction to Perspective*, Charles suggested using a spinning top and covering it with a circle divided into three segments coloured in red, yellow and blue respectively. Allegedly, the rotation would produce a white colour (see Figure 11.2).⁵¹ The second experiment should produce 'the colours of the Rainbow artificially' and was thus aimed at convincing his readers that the three primaries could engender the secondaries green, orange and purple by optical mixture too. For this purpose, Charles again provided an illustration that his readers had to replicate, hand-colour with paints, 'paste [...] on a dark cloud-coloured pasteboard' and spin (see Figure 11.2).⁵²

Charles's theory was very much in line with that of the leading optical physicist of the time: Sir David Brewster (1781–1868). In the 1820s, Brewster performed several experiments on spectral colours, which led him to postulate in an 1831 lecture at the Royal Society of Edinburgh the existence of just three primary colours of light, namely red, yellow and blue.⁵³ Trichromacy was furthermore supported as a universal colour-

48 *Ibid.*, p. 11.

49 *Ibid.*, p. 18.

50 *Ibid.*, p. 23, Plate 3, Subject 2; Hayter, *An Introduction to Perspective* (1813), p. 138, Plate 14, Fig. 2.

51 Hayter, *An Introduction to Perspective* (1813), p. 138. The figures supplied in the two books are different, though. While in the 1813 illustration the three segments are identical, in the 1826 illustration, the blue segment covers a semicircle, and yellow and red share the other semicircle equally. I tried to reproduce this experiment as illustrated but I was never able to produce white.

52 Hayter, *An Introduction to Perspective* (1813), pp. 138–39; Hayter, *Three Primitive Colours*, p. 26.

53 The lecture was published three years later. David Brewster, 'On a New Analysis of Solar Light, Indicating Three Primary Colours, Forming Coincident Spectra of Equal Length', *Transactions of the Royal Society of Edinburgh*, 12 (1834), 123–36.

mixing theory by the chemist and colourman George Field (1777–1854) in his influential books.⁵⁴ Likewise, the physicist James David Forbes (1809–1868) and the artist David Ramsay Hay (1798–1866) supported Charles Hayter's same trichromatic theory.⁵⁵ In the first half of the nineteenth century, the trichromatic property of the human eye had not yet been discovered.

Thanks to the experiments in optical physics conducted independently by Hermann von Helmholtz (1821–1894) and by one of Forbes's students, James Clerk Maxwell (1831–1879), trichromacy—as it was understood by early nineteenth-century colour theorists such as Hayter, Field and Brewster—was finally relegated to the field of colourant mixing. In 1852, Helmholtz discovered that paints and coloured light mix in two different ways, both involving three primary colours.⁵⁶ Maxwell proved the theory correct in 1857 by identifying the three primary colour signals perceived by the human retina, namely red, green and blue.⁵⁷ Finally, in 1867, Helmholtz clearly discriminated between additive (*Addition*) and subtractive (*Subtraction*) mixtures in his *Handbuch der physiologischen Optik*.⁵⁸ Their work combined to form the basis of the Young-Maxwell-Helmholtz theory, also known as the theory of trichromatic colour vision,⁵⁹ which 'imposed itself as the only fulfilling theory on color vision' until the publication of Erwin Schrödinger's (1887–1961) works on colour theory in the 1920s.⁶⁰

54 John Gage, *George Field and His Circle. From Romanticism to the Pre-Raphaelite Brotherhood* (London: Christie's, 1989), p. 60.

55 James David Forbes, 'Hints towards a Classification of Colours', *Philosophical Magazine. Series 3*, 34.228 (1849), 161–78; David Ramsay Hay, *A nomenclature of colours, applicable to the arts and natural sciences, to manufactures, and other purposes of general utility* (Edinburgh and London: W. Blackwood & sons, 1846). See also Giulia Simonini, 'James David Forbes' Mayerian Triangle', pp. 249, 257.

56 Hermann von Helmholtz, 'Ueber die Theorie der zusammengesetzten Farben', *Annalen Der Physik*, 163.9 (1852), 45–66.

57 James Clerk Maxwell, 'Account of Experiments on the Perception of Colour', *Philosophical Magazine and Journal of Science*, XIV, July 1857, 40–47; Millington, 'History of the Young-Helmholtz Theory', pp. 172–73.

58 Hermann von Helmholtz, *Handbuch der physiologischen Optik* (Leipzig: Leopold Voss, 1867), p. 276; José Luis Caivano, 'The Shape of Colour Order Systems and the Evolution of Colour Theory', in *Ordering Colours in 18th and Early 19th Century Europe*, ed. by Tanja Kleinwächter, Sarah Lowengard and Friedrich Steinle, *International Archives of the History of Ideas*, 244 (New York: Springer, 2023), 15–37 (p. 28).

59 John Gage, *George Field and His Circle*, p. 60.

60 In particular, *Über das Verhältnis der Vierfarben- zur Dreifarbentheorie*, a paper Schrödinger presented in 1920 at the Kaiserliche Akademie der Wissenschaften in Vienna and then published in 1925 (*Sitzungsbericht der Kaiserlichen Akademie der*

The timeframe in which the theory of trichromatic colour vision was finally established (the 1850s to the 1910s)—replacing the universal trichromatic theory supported by Charles Hayter, among others, in the early nineteenth century—might explain why Matthew Young proposed a new title for John Hayter's painting in 1917. In light of the new discoveries, the first curator of the Shipley Art Gallery might have noticed the controversial and obsolete character of Charles Hayter's colour theory and therefore renamed John's painting *A Controversy on Colour*.

Conclusion

I would like to conclude by highlighting three points. First, we do not know with certainty the drivers that led John Hayter to paint *Portraits of Hayter, Senior, and Three Young Artists*. We may speculate that John wanted to present his father not as an ordinary miniature painter but as a colour theorist and a man of science by portraying him with a glass prism in his hand. Moreover, considering that the painting was exhibited at the Royal Academy of Arts in 1823—in other words, precisely ten years after the first allegations of plagiarism were levelled at Charles Hayter—it seems plausible to suggest that John's painting was intended to restore his father's credibility for having copied, without acknowledging it, the work of a deceased fellow artist. In the 1810s, Moses Harris's *The Natural System of Colours* started to circulate among British painter-academic circles and was studied by practitioners and scholars. Harris's book was reprinted in a new edition in 1811. Consequently, in the 1820s, the Hayters felt compelled to prove that Charles Hayter's colour diagrams were original inventions. They used all possible means, including a painting exhibited at the Royal Academy of Arts, to champion their cause. However, I would argue the painting did not quite have the desired effect, and perhaps even fuelled the controversy around Hayter's plagiarism. Indeed, three years later, in 1826, Charles had to put on paper his defence against this allegation by publishing a book fully dedicated to his diagrams and colour theory: *A New Practical Treatise on the Three Primitive Colours*.

Wissenschaften Wien, Ila, 134: 471–90). See Valentina Roberti and Giulio Peruzzi, 'The Helmholtz Legacy in Color Metrics: Schrödinger's Color Theory', *Archive for History of Exact Sciences*, 77.6 (2023), 615–35 (pp. 616, 631).

Furthermore, the cause for the change of title of John's painting to *A Controversy on Colours* was not necessarily the originality of Charles's colour-mixing scheme but very likely the discoveries on optical physics made during the second half of the nineteenth century. These new scientific developments finally challenged a colour theory that had survived Newton's and was supported until the first half of the nineteenth century by many painters and scholars alike. Charles Hayter was a staunch advocate of the original trichromatic theory and was represented in his son's painting as a man of science. Matthew Young, the first curator of the Shipley Art Gallery, where John's painting now hangs, renamed it in 1917 with a new title suggesting that it depicts a controversy on colour. A controversy implies opposing views, but as we have seen, Charles and his eldest son, George, developed similar colour-mixing diagrams and supported the same colour theory. Thus, the controversy Young observed lay in Charles's obsolete view on trichromacy, with respect to the recent advent of the Young-Maxwell-Helmholtz theory.

Finally, despite the accusations against Charles of plagiarism and the fact that his colour theory became outdated in the second half of the nineteenth century, he merits being credited as the inventor of a colour scheme that merged for the first time prismatic colours—such as blue and green—and non-prismatic colours—such as brown and olive. Indeed, in the 1825 enhancement of the original scheme, Charles illustrated not only how purple, orange and green are created, but also how their mixtures produce brown, slate and olive. He perfected this diagram one year later, placed it in the frontispiece of his last book *A New Practical Treatise on the Three Primitive Colours* and called it 'Hayter's Compendium'.⁶¹

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61 For the image, see <https://archive.org/details/newpracticaltrea00hayt/page/n7/mode/1up>.

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PART V

12. John Ruskin's Painting Materials: A Quest for Durable Colour between Industry and Nature¹

Tea Ghigo

Introduction

Since the accidental synthesis of Prussian blue by German colourmaker Johann Jacob Diesbach in the eighteenth century led to its industrial production,² the industrialisation of colour manufacture has profoundly

1 Acknowledgements: Heartfelt thanks go to colleagues across the Conservation and Western Art departments at the Ashmolean Museum, notably to Caroline Palmer (Western Art Print Room Manager) for her assistance during the works on Ruskin's Teaching Collection and to Alexandra Greathead (Paper Conservation Manager), Daniel Bone (Head of Conservation) and Kelly Domoney (Conservation Manager) for their support during work at the Ashmolean. Warm thanks to Tracy Hodgson from the Ruskin Museum for allowing sampling and analysis of Ruskin's palette, to Lois Cowie from the Material Studies Lab at UCL for her help in preparing micro-samples, and to Victoria Lucas from the Institute of Archaeology at UCL for supporting SEM-EDS analyses. Special credit goes to Joyce Townsend and Fiona Mann for the fruitful discussion about nineteenth-century Britain's technological and historical context. Finally, thanks to the CHROMOTOPE project team members for the many informal conversations on colour that inspired part of this contribution.

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2 Barbara Berrie, 'Prussian Blue', in *Artists' Pigments vol. 3: A Handbook of Their History and Characteristics*, ed. by Elisabeth West FitzHugh (Washington, DC: National Gallery of Art, 1997).

transformed artistic practices.³ Diesbach's discovery, coupled with the opportunities introduced by the Industrial Revolution, marked the beginning of mass-produced artists' colours,⁴ a trend that accelerated dramatically in the second half of the nineteenth century with the introduction of coal tar dyes,⁵ which soon found applications in art.⁶

Many industrially produced colours were new products that did not occur naturally and were obtained artificially via chemical synthesis. In contrast, others were synthetic equivalents of natural pigments,⁷ such as synthetic ultramarine blue, whose chemical structure imitates the mineral lazurite, from which natural ultramarine blue had been manufactured since the Middle Ages. Finally, some industrial colours such as ochres which, chemically, were iron oxides of different types and colours were still manufactured from natural sources in a similar way to the past.

As artists became increasingly distanced from the processes of colour production, they relied on commercial suppliers (known in Britain as colourmen),⁸ who connected the industrial and the artistic worlds. At the same time, adulteration and the substitution of certain

3 *Colour Revolution. Victorian Art, Fashion and Design*, ed. by Charlotte Ribeyrol, Matthew Winterbottom, and Madeleine Hewitson (Oxford: Ashmolean Museum, 2023).

4 *The Colour Index, First Edition*, ed. by F.M. Rowe (Bradford: Society of Dyers and Colourists, 1924); Rutherford John Gettens and George Leslie Stout, *Painting Materials* (New York: Dover Publications, 1966); R.D. Harley, *Artists' Pigments c.1600-1835: A Study in English Documentary Sources* (London: Butterworth & Co., 1970); Leslie Carlyle, *The Artist's Assistant Oil Painting Instruction Manuals and Handbooks in Britain, 1800-1900, with Reference to Selected Eighteenth-Century Sources* (London: Archetype Publications, 2001); Heinrich Zollinger, *Color Chemistry: Syntheses, Properties, and Applications of Organic Dyes and Pigments* (New York: John Wiley & Sons, 2003); Nicholas Eastaugh, et al., *Pigment Compendium: A Dictionary of Historical Pigments* (Amsterdam: Elsevier, 2004).

5 'The Great Exhibition; about Dyes and Beauty and Coal-Tar Mauve and Magenta How Made Extraordinary Specimen of Aniline Art and New Colours.', *New York Times*, 28 July 1862; Simon Garfield, *Mauve: How One Man Invented a Color That Changed the World* (New York: W.W. Norton & Co., 2002); Maurice Rayner Fox, *Dye-Makers of Great Britain, 1856-1976: A History of Chemists, Companies, Products and Changes* (London: Imperial Chemical Industries, 1987).

6 Carlyle, *The Artist's Assistant Oil Painting Instruction Manuals and Handbooks in Britain, 1800-1900, with Reference to Selected Eighteenth-Century Sources*, 533-43.

7 In this article, the term 'pigment' indicates an inorganic compound, while 'dye' refers to an organic compound (which is made up largely of chains or rings of carbon atoms).

8 The word 'colourman' to indicate a dealer in colour and paint first appeared in 1663. See [https://www.merriam-webster.com/dictionary/colorman#:~:text=1,dyes%20\(as%20in%20leather%20manufacturing\).](https://www.merriam-webster.com/dictionary/colorman#:~:text=1,dyes%20(as%20in%20leather%20manufacturing).)

pigments with cheaper materials became common industrial practice, and colours were often commercialised with labels that barely, if at all, described their material composition.⁹ These practices prompted artists to publicly voice their concerns about the composition and durability of industrial materials. A famous instance is William Holman Hunt's 1880 lecture at the Royal Society of Arts, wherein he condemned industrial adulteration and called for the establishment of a 'society to look after the material interests of painting'.¹⁰

This chapter explores the impact of industrial progress on the artistic practice of John Ruskin, one of the most prominent art critics, cultural commentators and social philosophers of the Victorian era. Throughout his lifetime, Ruskin observed numerous technological advancements and often voiced his scepticism about their consequences. His critiques of industry, progress and other aspects of modernity sometimes earned him a reputation as a nostalgic figure inclined to idealise the past. For example, when discussing railroads, he once remarked:

No changing of place at a hundred miles an hour [...] will make us one whit stronger, happier, or wiser. There was always more in the world than men could see, walked they ever so slowly; they will see it no better for going fast.¹¹

Drawing on archival and material evidence, this chapter explores Ruskin's complex relationship with industrial colour manufacture. It begins with an analysis of his views on colour stability and preservation as documented in his correspondence and writings. Attention then turns to Ruskin's painting materials, summarising findings from scientific analyses conducted between 2022 and 2023 on his watercolours housed at the Ashmolean Museum in Oxford and presenting new insights from the material characterisation of Ruskin's only surviving painting palette,

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- 9 Joyce H. Townsend, et al., 'Later Nineteenth Century Pigments: Evidence for Additions and Substitutions', *The Conservator*, 19.1 (1995), 65–78; Leslie Carlyle, 'Authenticity and Adulteration: What Materials Were 19th Century Artists Really Using?', *The Conservator*, 17.1 (1993), 56–60.
 - 10 William Holman Hunt, 'The Present System of Obtaining Materials in Use by Artist Painters, as Compared with That of the Old Masters', *Journal of the Society of Arts*, 28.1431 (1880), 485–99 (p. 498).
 - 11 John Ruskin, *Modern Painters III*. Quoted in A. Davis, *The Cambridge Companion to John Ruskin*, ed. by Francis O'Gorman (Cambridge: Cambridge University Press, 2015), pp. 170–86.

preserved at the Ruskin Museum in Coniston, England.

A central theme of this discussion is the apparent tension between Ruskin's rejection of industrialisation and love for nature, on the one hand, and his use of modern industrial pigments, on the other. Ultimately, this chapter argues that Ruskin navigated the evolving colour industry by making careful choices that aligned with his preservation ideals, and highlights the nuanced ways in which he balanced his principles with practical considerations in his artistic practice.

Ruskin's Ideas on Colour Preservation and His Painting Materials

Ruskin engaged in the public debate around the quality and durability of industrial painting materials only sporadically. Nevertheless, his influential works clearly articulate his ideas about colour preservation in art. Colour was paramount to Ruskin, who in his *Elements of Drawing* (1857) stated: 'You ought to love colour, and to think nothing quite beautiful or perfect without it'.¹² Since the essence of an artwork was, for him, the delicate balance of colours intentionally devised by the artist, any colour change would have irremediably ruined a masterpiece.

The alteration of colour 'tormented' Ruskin, a word he used to describe his agitation when realising he could not prevent Turner's watercolours from fading or that the grey monks' garments in Giotto's St Francis cycle had turned red because of the damp.¹³ As an art critic and meticulous observer, Ruskin was painfully aware of the colour damage caused either by careless use of materials or poor conservation practices, and he spent most of his life striving to fight both. In a letter to Dante Gabriel Rossetti, dated 1859, Ruskin scolded him severely after having witnessed an irreparable change in colour in one of his paintings: 'This is not the only case of failure of colour from your careless way of using colours', and went on admonishing him: 'You must really alter your way of working, and mind what you are about'.¹⁴

12 John Ruskin, *The Elements of Drawing*, 1857, in *The Complete Works of John Ruskin Library Edition*, ed. by E.T. Cook and Alexander Wedderburn, 39 vols (London and New York, 1903-1912), 15:133.

13 John Ruskin to Charles Eliot Norton, December 28, 1858, in *Complete Works*, 36:296; John Ruskin to John Brown, June 28, 1874, in *Complete Works*, 37:119.

14 John Ruskin to Dante Gabriel Rossetti, 1859, in *Complete Works*, 36:301.

Likewise, in letters to various correspondents, he repeatedly mentioned the terrible effects of light and smoke on colours and encouraged the recipients to exhibit art exclusively in spaces that respected specific environmental conditions.¹⁵ The bitter frustration that sharply emerges between the lines of his correspondence suggests that he was among the few in England who truly grasped the significance of what we now refer to as 'preventive conservation', which focuses primarily on controlling the environmental conditions in which art is stored and displayed:

I lose a frightful quantity of time because people won't read what I ask them to read, nor believe anything of what I tell them, and yet ask me to talk whenever they think they can take a shilling or two at the door by me. I have written fifty times, if once, that you can't have art where you have smoke.¹⁶

Furthermore, Ruskin keenly understood the exceptional vulnerability of delicate works on paper. In a lecture on political economy delivered in Manchester on 10 July 1857, he expressed his poignant concern, for Britain had 'put a great quantity of genius, within the last twenty years, into water-colour drawing [...] with the most reckless disregard whether either the colours or the paper will stand'.¹⁷ His disappointment stemmed largely from the absence of a quality paper manufacturer in England, which he found unacceptable in a country where rampant industrial progress was celebrated persistently. He pointed out his frustration at the fact that the 'recklessness of modern paper manufacture' would prevent Britain from growing a national wealth thanks to the work of 'water-colour painters [who] are becoming every day capable of expressing greater and better things' and noted in a sardonic plea:

Among the many favours which I am going to ask from our paternal government, when we get it, will be that it will supply its little boys with good paper. You have nothing to do but to let the government establish a paper manufactory, under the superintendence of any of our leading

15 John Ruskin to the Editor of *The Times*, 1847, in *Complete Works*, 12:398–99; John Ruskin, *Turner Bequest*, 1856–58, 1876, 1878, in *Complete Works*, 13:83, 176–81, 341–45, 399–400.

16 John Ruskin to the Sheffield Society of Artists, February 18, 1876, in *Complete Works*, 34:521.

17 John Ruskin, *Education in Art*, 1858, in *Complete Works*, 16:143.

chemists, who should be answerable for the safety and completeness of all the processes of the manufacture.¹⁸

To prevent watercolours and drawings from rapid deterioration, Ruskin meticulously devised a preservation strategy focused on safeguarding these fragile works from the damaging effects of dust and light. He used this approach as he sorted through the extensive collection of drawings in the Turner Bequest when preparing a selection of these works for their exhibition at Marlborough House. Similarly, he applied this preservation strategy to his own collections. In a letter to the editor of the *Daily Telegraph* dated 1876, Ruskin outlined the calculated methodology used for Turner's works, which consisted of protecting them from dust and other pollutants at all times, and limiting light exposure to the time required for study and observation:

They are framed as I frame exercise-drawings at Oxford, for my own schools. They are, when in use, perfectly secure from dust and all other sources of injury; slide, when done with, into portable cabinets; are never exposed to light, but when they are being really looked at; and can be examined at his case, measured, turned in whatever light he likes, by every student or amateur who takes the smallest interest in them [...] Thus taken care of, and thus shown, the drawings may be a quite priceless possession to the people of England for the next five centuries.¹⁹

If, on the one hand, Ruskin made it clear that suitable preservation strategies could extend the life of artworks, his aforementioned correspondence with Rossetti indicates that he believed artists had an obligation to choose their painting materials carefully. Despite his call for the British government's assistance in procuring suitable paper to produce durable art, he felt there was no need to establish a national institution for safeguarding artists' painting materials. For him, 'the quality of colour is more within the artist's power of testing, and [...] any painter may get permanent colour from the respectable manufacturers, if he chooses'.²⁰ Therefore, artists should experiment with colours to become familiar with their properties, and when painting, they should select only the most durable pigments.

Painting with durable colours and striving to preserve art in the best

18 John Ruskin, *Education in Art*, 1858, in *Complete Works*, 16:143.

19 John Ruskin to the Editor of the *Daily Telegraph*, 1876, in *Complete Works*, 13:341-45.

20 John Ruskin, *A Joy Forever*, 1857, in *Complete Works*, 16:45.

possible environmental conditions was not only a matter of ethics or political economy but also a calculated preventative strategy for Ruskin. Only if painted with the best materials and stored or exhibited in an appropriate manner would art endure the ravages of time and escape the greatest danger of all: restoration in the form of pictorial reintegration, which Ruskin ultimately felt was 'total destruction'.²¹

To understand whether and how Ruskin's ideas on colour preservation influenced his artistic practice, we must examine the materials he used as a watercolourist. In the following sections, archival and material evidence is gathered and analysed to offer a comprehensive perspective on this subject.

Ruskin's Printed Works

Written traces of Ruskin's painting materials are sporadic and scattered across his published works and private letters. While in his educational manual, *The Elements of Drawing*, he occasionally offered rudimentary guidance to pupils on what paper to use for their exercises, such as 'a piece of quite smooth, but not shining, note-paper',²² precise details on the type of paper he used for his own works and where he purchased it remain absent from his texts.

Regarding pigments, two extensive lists appear in sources from the 1850s. The earliest is found in a letter addressed to Rossetti dated May 1855, where Ruskin mentioned the colours he used. The list includes both traditional pigments, such as ochres, and new compounds, such as Prussian blue, cadmium and chrome yellows:

Meantime, the following is the list of my colours: Emerald-green, cobalt [blue], smalt, Prussian blue, indigo, pink madder, carmine, Venetian red, light red, vermilion, blue black, burnt sienna, madder brown, burnt umber, Roman ochre, brown ochre, yellow ochre, gamboge, yellow lake, cadmium yellow, lemon yellow, chrome yellow, orange chrome. Could you kindly write those you find useful besides, on another sheet of paper, and tell bearer where to get violet carmine? The others you name he can get at Winsor & Newton's, as their half cakes fit my box.²³

21 John Ruskin, *The Stones of Venice II*, 1851-1853, in *Complete Works*, 10:435; John Ruskin to the Editor of *The Times*, 1852, in *Complete Works*, 12:407.

22 John Ruskin, *The Elements of Drawing*, 1857, in *Complete Works*, 15:29.

23 John Ruskin to Dante Gabriel Rossetti, May 1855, in *Complete Works*, 36:202.

Most of these pigments also appear in the section 'On Colour' of the *Elements of Drawing*, where another comprehensive selection is provided in a footnote as a recommendation to the aspiring colourist. In addition to the pigments mentioned in the letter to Rossetti, Antwerp blue, Hooker's green, raw sienna, Indian red, mars orange, Van Dyck brown, sepia and Chinese white are included.²⁴

Further mentions of specific pigments are found in later texts. In a letter to Edward Burne-Jones dated 5 March 1864, Ruskin advised him to restrict his palette to just six colours: vermilion, violet carmine, cobalt, smalt, Chinese white and emerald green.²⁵ Finally, in the late part of his life, Ruskin mentioned in his own manuscript of the incomplete autobiography *Praeterita* (1885) that he had been experimenting with Naples yellow.²⁶

The Watercolours at Oxford

In 2022 and 2023, Ruskin's painting materials were systematically investigated through scientific analysis of twenty-five watercolours preserved at the Ashmolean Museum in Oxford.²⁷ These proceed from Ruskin's teaching collection, which he curated in 1871 for his newly founded school of drawing at Oxford.²⁸ They date mainly to the 1860s and 1870s and include studies of architecture, landscapes and other studies from nature, which Ruskin had painted while travelling across Europe. Their visual examination revealed that Ruskin used a variety of paper supports, including blue and white paper of different weights and textures (laid and wove). This extensive range suggests that he did not adhere to a singular preferred type of paper, likely because of his disappointment with England's manufacture in this domain. This might explain why specific indications regarding the type of paper he used are

24 John Ruskin, *The Elements of Drawing*, 1857, in *Complete Works*, 15:142.

25 John Ruskin to Edward Burne-Jones, 5 March 1864, in *Complete Works*, 36:467–8.

26 John Ruskin, *Praeterita*, 1886–1889, in *Complete Works*, 35:626.

27 This analysis was conducted as part of the project 'Ruskin's Painting Materials', initiated by the author of this chapter and funded by the Leverhulme Trust. See Tea Ghigo, et al., 'Concerns over colour durability in the nineteenth-century industrial revolution: insights from John Ruskin's teaching collection', *Heritage Science*, 11 (2023), 168, <https://doi.org/10.1186/s40494-023-01010-6>.

28 *Complete Works of John Ruskin*, 21: xvii–xix.

lacking in his printed works. However, it must be noted that, despite Ruskin's apprehension about the durability of the paper available to him, the support of his watercolours was found to be in exceptional condition. The paintings themselves have also maintained an exceptional vibrancy of colour, with minimal signs of pigment deterioration. This remarkable preservation can likely be attributed to Ruskin's own deliberate efforts in implementing specific preservation strategies for his collection at Oxford.

The pigments of the Oxford watercolours were thoroughly investigated with a combination of analytical techniques. A complete list of the watercolours studied, with a detailed description of the analytical methods used and a thorough discussion of the results and their interpretation, has been published elsewhere,²⁹ and digital images of most watercolours analysed are available online.³⁰ As an example, Figure 12.1 shows the macro X-ray fluorescence analysis of *Study of a Kingfisher*, the masterpiece of the collection, often regarded as a symbol of Ruskin's profound love for the colours of nature. The colour-coded map shows the distribution of iron (Fe) in orange, cobalt (Co) in blue, copper (Cu) in yellow, arsenic (As) in cerulean shades, mercury (Hg) in red and zinc (Zn) in white across the surface of the watercolour. From this elemental distribution, it can be inferred that most pigments colouring the natural plumage of the kingfisher stemmed from nineteenth-century progress in chemical synthesis. The wing and tail of the kingfisher, which Ruskin painted with a bright blue colour, are rich in cobalt, revealing the use of cobalt blue, while the deep green highlights on the bird's neck were made with emerald green, as revealed by the presence of both copper and arsenic. Chinese white, rich in zinc, was used for white highlights, and lemon yellow (barium chromate) for the touches on the Kingfisher's head (not visible in Figure 12.1). Finally, the presence of iron and mercury shows that Ruskin also resorted to more traditional pigments such as ochres and vermilion. Similar results were found across the entire collection and highlighted how, in his artistic practice, Ruskin mastered the skill of rendering the colours of nature mainly with non-natural pigments.

29 Tea Ghigo, et al., 'Concerns over colour durability in the nineteenth-century industrial revolution: insights from John Ruskin's teaching collection', *Heritage Science*, 11 (2023), 168, <https://doi.org/10.1186/s40494-023-01010-6>.

30 <http://ruskin.ashmolean.org/>.

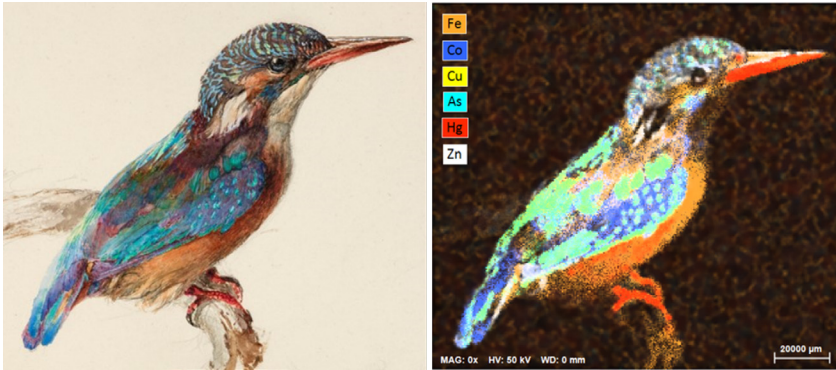


Fig. 12.1. John Ruskin, *Study of a Kingfisher*, 1871, Ashmolean Museum, WA.RS. RUD.201; and macro X-ray fluorescence map.

Ruskin's Watercolour Box

Ruskin spent his final years in the Lake District, where he moved in 1872 after purchasing a house in Brantwood, on the east side of Coniston Water.³¹ Thanks to a collaboration with the Ruskin Museum in Coniston, a material investigation of the pigments contained in his only surviving watercolour box and palette was conducted at UCL's Material Studies Laboratory (History of Art) and the Wolfson Laboratory (Institute of Archaeology, University College London). Although the museum holds no extensive historical information on this object, it is reasonable to assume that the palette dates from the final period of Ruskin's life, as it was donated shortly after his death. Figure 13.2 depicts the palette, which is a metal box with an inner compartment divided into three sections. One section contains eight whole watercolour cakes in ceramic pans, and another houses eight half-cakes, although only six ceramic pans with pigments remain. The box's metal flaps, which double as painting palettes, bear remnants of pigment mixtures. No brand, date or other textual information is visible on the box; however, its shape and size are consistent with the 'Japanned tin' watercolour boxes produced by Rowney and Winsor & Newton in the nineteenth century.³²

31 Edward Tyas Cook, *The life of John Ruskin* (London: George Allen & Company, 1911).

32 See colourmen catalogues at the end of: Charles H. Weigall, *Figure Drawing: Practical*

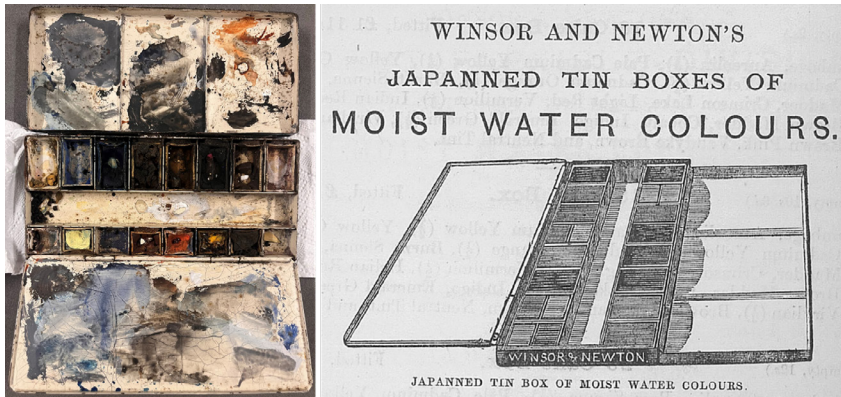


Fig. 12.2. Left: Ruskin's painting palette, courtesy of the Ruskin Museum, Coniston. Right: picture of a 'Japanned tin box' extract from John William Bradley, *A Manual of Illumination on Paper and Vellum; a Companion to Manual of Illumination*, 22nd edn (London: Winsor & Newton, 1880).

The pigments in the box appear rather dark due to surface deterioration, with only a few colours—such as bright yellows and red—distinguishable visually. Fifteen micro-samples were collected from different sites across the inner compartment to obtain a representative sample of each colour. Loose pigment particles were sampled whenever possible to preserve the integrity of the object. The samples were embedded in synthetic resin, polished to reveal their cross-section and observed under the optical microscope to distinguish their original colour. Material analyses were performed using scanning electron microscopy with energy-dispersive X-ray spectroscopy (SEM-EDX) and micro-Raman spectroscopy equipped with a 532 nm laser. Eleven different pigments were distinguished, although not all of them could be unequivocally identified. Four samples displayed a red/purplish translucent appearance under the microscope and contained mainly aluminium and phosphorus, indicating the presence of organic colourants precipitated on a substrate (lake).³³ SEM-EDX revealed a very similar chemical composition across

Instructions for a Course of Study in This Branch of Art (London: Winsor & Newton, 1852); Aaron Penley, *A System of Water-Colour Painting*, 17th edn (London: Winsor & Newton, 1858); Henry O'Neill, *A Guide to Pictorial Art: How to Use the Black Lead Pencil, Chalks, and Water Colours* (London: Rowney, 1861); John William Bradley, *A Manual of Illumination on Paper and Vellum; a Companion to Manual of Illumination*, 22nd edn (London: Winsor & Newton, 1880).

33 J.O. Kirby, Marika Spring and Catherine Higgitt, 'The Technology of Red Lake

these four samples, suggesting they represent a single pigment. However, the exact composition of the red colourant remains unidentified. The analyses also identified red and yellow ochres, cadmium yellow, lemon yellow (barium chromate), cobalt blue, Prussian blue and Chinese white. Additionally, four samples exhibited a dark or brownish appearance under the microscope and a chemical composition rich in iron, typical of ochres. Variations in the aluminium and silicon content indicated that these samples correspond to different pigments, consistent with archival research that showed Ruskin used different types of brown ochres. Table 12.1 summarises the results of the analyses.

Table 12.1. Summary of the material analysis of samples from Ruskin's painting palette.

Sample colour*	Main Elements (SEM-EDX)	Raman peaks (cm ⁻¹)	Interpretation
Red translucent	Al, P	-	Organic lake
Red matte	Fe, Al	297, 226, 415, 688, 630, 509	Red ochre
Dark yellow	Fe, Si	301, 402, 148	Yellow ochre
Yellow	Cd, S	302, 601	Cadmium yellow
Bright yellow	Ba, Cr	868, 902, 351, 409	Lemon yellow
Bright blue	Co, Al	-	Cobalt blue
Dark blue	Fe	2155, 2090	Prussian blue
Brownish	Fe, Si, Al	-	Ochre
Brownish	Fe, Si	-	Ochre
Brownish	Fe	-	Ochre
White	Zn, O	-	Chinese white

* Observed in cross-section under the optical microscope.

A comparison of the pigments mentioned in Ruskin's writings (mainly from the 1850s) with those identified in his watercolours (dating to the 1860s and 1870s) and in his painting palette (likely from the late nineteenth century) reveals a remarkable consistency over time. With very few exceptions, the same selection of pigments appears across these

sources, suggesting that, through much of his artistic career, Ruskin invested considerable effort in procuring a specific selection of colours. Furthermore, this evidence highlights that he frequently used colours introduced thanks to chemical and industrial progress, such as Chinese white;³⁴ cobalt and Prussian blues; cadmium, chrome and lemon yellow; and emerald green.

A Controversial Mind?

Ruskin partly earned his fame across a broad audience thanks to his accurate description of the detrimental effects of industrialisation. He blamed industrialisation primarily for introducing the division of labour, which was, for him, the greatest threat to human creativity and, thus, happiness, continuously endangered by the monotonous repetition of soul-destroying tasks.³⁵ He ultimately felt that industrialisation would drive the labouring class into cultural and material poverty.³⁶ Ruskin was equally concerned about the devastating effects of industrial pollution, which he captured with both his erudite penmanship and outstanding ability to render realistic colours with his brush.³⁷

As a major cultural commentator of his age and fierce opponent of the Industrial Revolution, Ruskin could not remain silent about the industrialisation of colour production, particularly upon witnessing the advent of coal tar dyes, whose discovery resonated across a broad public.³⁸ In 1861, he wrote the following note concerning the recent introduction of the dye magenta, which followed mauveine:

34 On Chinese white, see Fiona Mann's chapter in this volume.

35 John Ruskin, *The Stones of Venice II* (1851-53), in *Complete Works*, 10:196.

36 Charles Harvey and Jon Press, 'John Ruskin and the Ethical Foundations of Morris & Company, 1861-96', *Journal of Business Ethics*, 14 (1995), 181-94; Ruskin, *Complete Works*, vol. 17.

37 John Ruskin, *The Storm-cloud of the Nineteenth Century*, 1884, in *Complete Works*, 34; Ruskin, *Turner & the Storm Cloud (Exhibition Catalogue)*, ed. by Suzanne Cooper and Richards Johns (London: Paul Holberton Publishing, 2019).

38 Anonymous, 'The International Exhibition', *Illustrated London News*, 5 July 1862; 'The Great Exhibition; about Dyes and Beauty and Coal-Tar Mauve and Magenta How Made Extraordinary Specimen of Aniline Art and New Colours.', Anonymous, 'The Mauve Measels', *Punch*, 20 August 1859; Anonymous, 'Beautiful Tar', *Punch*, 15 September 1888.

We moderns, who have preferred to rule over coal-mines instead of the sea [...] have actually got our purple out of coal instead of the sea! And [...] have completed the shadow, and the fear of it, by giving it a name from battle, —Magenta.³⁹

Charlotte Ribeyrol compellingly argues that Ruskin's rejection of coal tar dyes was rooted in his deep religious faith and spiritual love for nature, as revealed by a literary analysis of Ruskin's own writings on colour.⁴⁰ For Ruskin, coal tar dyes, made from a lump of black matter rather than from naturally coloured materials, desanctified colour by disconnecting it from nature, which he perceived as the sole harbinger of authentic colours:

There is no climate, no place, and scarcely an hour, in which nature does not exhibit colour which no mortal effort can imitate or approach. For all our artificial pigments are, even when seen under the same circumstances, dead and lightless beside her living colour.⁴¹

In fact, one could argue the same for all those industrial colours which were obtained via a series of chemical reactions rather than being manufactured from natural sources. Even if unaware of this analysis, scholars familiar with Ruskin's literary legacy would likely assume he painted with natural pigments, excluding artificial colours from his strikingly accurate depictions of birds, flowers, dawns and landscapes. Yet the evidence presented above clearly discredits any such assumption.

'Using What is Inevitable to the Best Purpose'⁴²

In his artistic experience, Ruskin's dream of returning to rural life in a pre-industrialised society—which he tried to pursue by founding and

39 John Ruskin, *The Queen of the Air*, 1869, in *Complete Works*, 19:380.

40 Charlotte Ribeyrol, 'Victorian Rainbow Makers: Variations on Colour Poetics', *Angles. New Perspectives on the Anglophone World*, no. 4 (1 April 2017), <https://doi.org/10.4000/angles.1548>; Charlotte Ribeyrol, 'Religion and Ritual', in *A Cultural History of Color in the Age of Industry*, ed. by Alexandra Loske (London: Bloomsbury, 2021), pp. 89–109.

41 John Ruskin, *Modern Painters I*, in *Complete Works*, 3:280.

42 John Ruskin, *Fors Clavigera: Letters to the Workmen and Labourers of Great Britain*, 1871–1876, in *Complete Works*, 28:247. In 1875, Ruskin justified with this statement his use of the railroads despite his reservations about this new transport network.

endowing the Guild of St George—stridently clashed with the highly industrialised reality of colour manufacture.⁴³ With the Industrial Revolution, artists progressively distanced themselves from the technical processes involved in colour preparation. On the one hand, colour-making and preparation had moved away from the artist's workshop to find a place in chemical factories. On the other, since the eighteenth century, the Royal Academy of Art had increasingly emphasised theory and ideas over teaching the practice of painting.⁴⁴ Workshop secrets regarding materials and techniques that had played a vital role in the artist's training were now transmitted sporadically through limited channels such as private lessons and personal friendships. In a few generations, artists had lost an essential part of the material know-how formerly part of their instruction, as some forcefully lamented.⁴⁵

Despite rejecting industrialisation from an ethical and environmental point of view, Ruskin could not avoid relying on industrial products in his artistic practice. However, he could have chosen to resort exclusively to industrial materials (allegedly) produced from natural sources such as ochres, and perhaps, in a desperate effort to maintain a feeble connection with the natural world, expanded his palette to include synthetic pigments imitating nature, such as synthetic ultramarine. Instead, he extensively used new synthetic pigments brought about by chemical and technological progress, such as Chinese white, cobalt blue and emerald green, and I wish to argue that he made a conscious and calculated choice to do so.

George Field's *Chromatography* and the Science of Permanence

In *The Elements of Drawing*, Ruskin advised the aspiring artist to refer to the manual *Chromatography*, initially published by George Field

43 *Ibid.*, vol. 27.

44 James Ayres, *Art, Artisans and Apprentices: Apprentice Painters & Sculptors in the Early Modern British Tradition* (Oxford: Oxbow Books, 2014), 434–35; Joyce Townsend, Jacqueline Ridge, and Stephen Hackney, *Pre-Raphaelite Painting Techniques, 1848–56* (London: Tate Publishing, 2004), 10.

45 William Holman Hunt, 'The Present System of Obtaining Materials in Use by Artist Painters, as Compared with That of the Old Masters', 485–99.

in 1835 and later reissued in multiple editions.⁴⁶ Field (c.1777–1854) was a chemist, colour-maker and supplier who started his journey in colour manufacture by attempting to grow plantations of madder in England, a task that had kept many professionals in textile-dyeing occupied. However, by 1800, Field had already shifted his attention to the artistic world and was experimenting to improve the permanence of lake pigments prepared from madder.⁴⁷ He opened several factories across England and manufactured colours that he later sold to renowned colourmen such as Roberson and Winsor & Newton.⁴⁸ Field extensively researched methods of colour manufacture from madder and introduced several new colours, including pink madder, which he prepared by selectively extracting from the plant root only specific coloured molecules, namely purpurin, pseudopurpurin and purpuroxanthin.

Aware of artists' concerns about colour durability, Field soon started to test the stability of pigments, recording his experiments in manuscript notebooks (dating from between 1804 and 1825) that still survive. After having spread the pigments on glass slabs, Field tested their stability to light by exposing them to direct sunlight until a carmine lake (a notoriously fugitive pigment) had faded completely. He then tested their resistance to damp and foul air by exposing the pigments 'behind the seat of a privy' for the same length of time.⁴⁹

Field's experiments informed his *Chromatography*, which Ruskin considered a fundamental text for anyone who 'wish[ed] to take up colouring seriously'.⁵⁰ The manual gave an overview of commercially available pigments, describing their composition and sometimes detailing the reagents used to synthesise 'modern pigments'. For instance,

46 George Field, *Chromatography; or, A Treatise on Colours and Pigments, and of Their Powers in Painting* (London: Charles Tilt, 1835); Linda M. Shires, 'On Color Theory, 1835: George Field's Chromatography', *BRANCH: Britain, Representation and Nineteenth-Century History* (blog), https://branchcollective.org/?ps_articles=linda-m-shires-on-color-theory-1835-george-fields-chromatography.

47 John Gage, 'A Romantic Colourman: George Field and British Art', *The Volume of the Walpole Society* 63 (2001), 1–73.

48 Shires, 'On Color Theory, 1835'.

49 Rosamund D. Harley, 'Field's Manuscripts: Early Nineteenth Century Colour Samples and Fading Tests', *Studies in Conservation* 24.2 (1979), 75–84.

50 John Ruskin, *The Elements of Drawing*, in *Complete Works*, 15:142 (footnote).

in describing chrome yellow, he reported that it 'is a pigment of modern introduction into general use, and of considerable variety, which are mostly chromates of lead', while he said that Prussian blue was 'rather a modern pigment, produced by the combination of the prussic hydrocyanic acid and iron'.⁵¹ Most importantly, Field contributed invaluable to the nineteenth-century debate around colour durability by classifying pigments in different tables based on their stability to light, damp and pollutants.⁵²

A comparative analysis of Ruskin's pigments—as referenced in his letters—alongside Field's findings indicates that Ruskin's painting practice closely aligned with the preservation strategies he applied to his art collection at Oxford. Significantly, the majority of the pigments mentioned in Ruskin's 1855 letter to Rossetti, as quoted above, appear in Field's table of the most permanent pigments. The remaining pigments were found by Field to be stable under light exposure, though not resistant to damp or pollutants. Only five out of twenty-four pigments—Prussian blue, indigo, carmine, gamboge and yellow lake—were noted by Field to suffer from light damage.⁵³ Far from being a coincidence, Ruskin's careful selection of pigments underscores his deep commitment to the conservation of art and demonstrates his concern for minimising changes in colour due to light exposure. This approach mirrors his efforts to maintain specific environmental conditions for storing or exhibiting artworks, indicating that he addressed conservation issues even during the artistic creation process.

Ruskin likely sought to instil these values in his circle, although literary evidence of his attempts is limited. In *Elements of Drawing*, he advised aspiring artists to experiment with a broad range of pigments, including Antwerp blue, Prussian blue and indigo, despite their poor stability. He remarked, 'you need not care much about permanence in your work yet',⁵⁴ suggesting that experimentation and familiarisation with a range of available colours should precede the commitment to

51 Field, *Chromatography; or, A Treatise on Colours and Pigments, and of Their Powers in Painting*, pp. 77, 111–12.

52 *Ibid.*, pp. 183–87.

53 *Ibid.*, p. 184.

54 John Ruskin, *The Elements of Drawing*, 1857, in *Complete Works*, 15:142.

creating permanent art. In contrast, in an 1864 letter addressed to the professional artist Burne-Jones, Ruskin recommended a more restricted palette, almost exclusively comprising lightfast pigments.⁵⁵

The pigments identified on the watercolours at Oxford and those found in Ruskin's watercolour box at Coniston further demonstrate that Field's research informed Ruskin's painting practice. In both cases, a variety of lightfast pigments were identified, including both traditional and new colours such as a range of ochres, lemon yellow, cadmium yellow, cobalt blue and Chinese white. The frequency of use of these different pigments further corroborates this interpretation.

Figure 12.3 summarises the occurrence of different pigments in Ruskin's watercolours at Oxford, with the colour of each bar representing the pigment's stability according to Field's experiments. As expected, the chart shows that Ruskin used less stable pigments, such as Prussian blue and organic yellows (e.g., gamboge and yellow lake), far less frequently than more stable alternatives such as cobalt-based blues, cadmium yellow or ochres. The prevalent use of Chinese white—despite its perceived instability today—reflects Field's views on the pigment, which he considered a valuable addition to the watercolour palette for its durability and lower toxicity compared to barium white.⁵⁶ During the analyses of the Oxford collection, madder lakes—ranging in shades from pink, red and purple to brown—were identified occasionally. Field described these as the 'most valuable acquisition of the palette in modern times' because of their permanence and transparency.⁵⁷ However, many organic red and purple pigments in Ruskin's works remain unidentified. The interpretation presented in this article suggests that most of the unidentified reds and purples likely included various shades of madder-based pigments rather than the less stable carmine red manufactured from cochineal.

55 John Ruskin to Edward Burne-Jones, 5 March 1864, in *Complete Works*, 36:467–68.

56 Field, p. 70.

57 *Ibid.*, pp. 97–98.

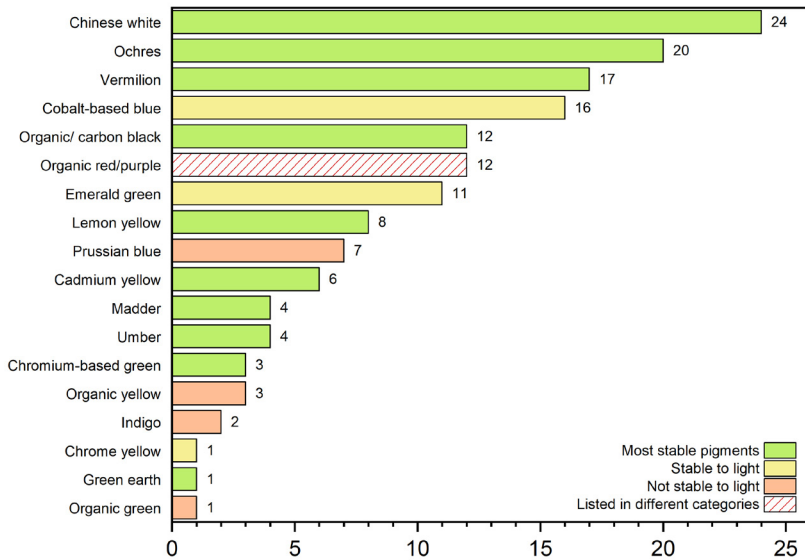


Fig. 12.3. Occurrence of pigments in Ruskin's watercolours at Oxford, with an indication of their level of stability, as noted in Field's *Chromatography* (1835).

N.B.: red organic colourants were identified in a few cases. When this was not achieved, the level of pigment stability could not be determined.

Conclusion

At first glance, Ruskin's fierce critique of newly synthesised coal tar dyes might portray him as a reactionary figure, seemingly nostalgic and inclined to dwell in the past. A rapid survey of his extensive body of work seems to confirm this idea, as it reveals numerous instances where he employed his witty penmanship to comment sardonically on a long list of technological advancements, ranging from the bicycle to the microscope.⁵⁸

⁵⁸ See, for instance, John Ruskin, *Fors Clavigera: Letters to the Workmen and Labourers of Great Britain*, 1871-1876, in *Complete Works*, 27:85; John Ruskin, *Modern Painters III*, in *Complete Works*, 5:380-1. Quoted in Alan Davis, 'Technology', in *The Cambridge Companion to John Ruskin*, ed. by Francis O'Gorman (Cambridge: Cambridge University Press, 2015), pp. 170-86; John Ruskin, *The Stones of Venice III*, 1851-1853, in *Complete Works*, 11:201-203. Quoted in Tim Barringer, 'An Antidote to Mechanical

However, a thorough contextual analysis of these examples conducted in previous works showed that the depiction of the critic as a staunchly anti-technological and nostalgic Victorian is entirely misleading. Alan Davis pointed out that Ruskin's concerns around technological innovations did not stem from an outright rejection of progress and modernity but rather focused on societal implications. His distress lay in the 'contrast between the advanced technology of the doing and the questionable nature of what is being done'.⁵⁹ Similarly, Tim Barringer analysed the evolving relationship between Ruskin and photography, highlighting that the critic's rejection of this medium as an art form stemmed from societal, ethical and spiritual reasons. Ruskin perceived photography as an entirely mechanised process that provided a shortcut to bypass the rigorous training needed to acquire artistic skills.⁶⁰ These nuanced perspectives help to resolve the apparent contradictions between Ruskin's ideologies and his actions, for example, his critical views on railroads despite the fact that he occasionally used them for travel.

The insights obtained through the investigation of Ruskin's painting materials align with Davis and Barringer's analyses. They indicate that Ruskin's perspective was far more nuanced than a simplistic stance for or against industry and technology. As a watercolour artist in a world transformed by the Industrial Revolution, Ruskin carefully selected which aspects of modernity to embrace and which to reject. His choices reflect a complex relationship with scientific progress and industrial manufacture, guided by his firm principles of art preservation. If his strong opinion against coal tar dyes might have kept him from using these colours (and I would argue his perception of them was largely influenced by their notorious fugacity), the same did not apply to more permanent synthetic pigments such as cobalt blue, emerald green and lemon yellow. Above all, Ruskin valued permanence, and his dedication to achieving it highlights the depth of his perspective.

Poison: John Ruskin, Photography and Early Pre-Raphaelite Painting', in *The Pre-Raphaelite Lens*, ed. by Dian Waggoner (Farnham: Ashgate/Lund Humphries, 2010), pp. 18–32.

59 Davis, 'Technology', in *The Cambridge Companion to John Ruskin*, pp. 170–86.

60 Barringer, 'An Antidote to Mechanical Poison', in *The Pre-Raphaelite Lens*, pp. 18–32. On Ruskin and photography, see also Sandra Kemp, 'Ruskin and "the Most Marvelous Invention of the Century"', in *Ruskin, Turner and the Storm Cloud (Exhibition Catalogue)*, ed. by Suzanne Cooper (London: Paul Holberton Publishing, 2019), pp. 103–07.

Whether engaging with art as a critic, curator or practitioner, Ruskin consistently maintained an interdisciplinary outlook 'grounded in the material substance of the world', as Dinah Birch described it.⁶¹ When approaching colour, he considered both aesthetic and material/conservation perspectives. Although he sometimes felt overwhelmed by the rapid advancements in chemistry and natural sciences—remarking that 'since my time crystallography alone has become a science for nine lives, and there are seven new elements or so, names ending in Um, in Chemistry'⁶²—he nevertheless grounded his painting practice in the work of esteemed chemists. This interdisciplinary approach allowed him to capitalise on the opportunities presented by technological progress, carefully selecting the most durable synthetic pigments and combining them with the most durable historical ones. Ultimately, as a watercolour painter and art critic, he supported the transformations brought about by scientific progress, provided they fostered human creativity and helped it reach its full potential, producing a lasting artistic legacy that would inspire generations for years to come.

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61 Dinah Birch, "'Utopian Topics': Ruskin and Oxford', *Essays in Criticism*, 69.2 (2019), 117–35 (p. 125).

62 Ruskin to Charles Eliot Norton, 6 October 1863, in *Complete Works*, 36:456.

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13. ‘Rather Revolution than Evolution’: Chinese White and Watercolour Painting Techniques in England 1850–1880

Fiona Mann

In his important work *Chromatography* (1835), the eminent chemist and colourmaker George Field (1777–1854) described the pigment white as ‘the instrument of light in painting’, a colour which, as a neutral, is ‘composed of all colours’.¹ Perfect white was described as being opaque, a symbol of ‘purity, delicacy, innocence, timidity, gentleness, dignity, piety, peace, and the all modest virtues’.² The increasing levels of white adopted by watercolour painters in England during the second half of the nineteenth century, however, caused controversy and dissent, while arguments concerning its ‘legitimacy’ as a pigment raged in the press. How was it that such an innocent, peaceful pigment could become the subject of so much debate?

Today, the attention increasingly being paid to the study of the materials and techniques used in oil painting has proved of great value, both in conservation and in the dating and authentication of works. Similar understanding of the materiality of watercolours is also needed, if we are to appreciate how artists achieved radical new effects in a medium which has long been celebrated internationally as one of the jewels of

1 George Field, *Chromatography, or, a Treatise on Colours and Pigments, and of Their Powers in Painting, &c.* (London: Charles Tilt, 1835), p. 61.

2 *Ibid.*, p. 62.

English national heritage. This chapter will discuss the introduction of the new nineteenth-century white pigment, Chinese white, in 1834, analysing its dramatic and controversial impact on watercolour practice in England and the challenges it faced in the critical and public arena.

The Problem of White in Watercolour before 1850

The English school of watercolour painting has generally been described as having evolved from the humble eighteenth-century tradition of topographical drawing, in which thin washes of transparent tint were applied over a graphite drawing, with highlights created by leaving areas of the underlying white paper uncovered. Successful early nineteenth-century landscape artists such as David Cox (1783–1859) consistently avoided using white paint, creating white highlights by scratching, scraping, rubbing or stopping out where required.³

Although white was actively avoided by those creating what the Royal Academy termed ‘tinted’ or ‘stained’ drawings, a number of artists did incorporate white pigments into their watercolours in the late eighteenth and early nineteenth centuries. Each of these pigments, however, posed difficulties when used. Lead white, or flake white, was prone to turning black in watercolour, as well as having a destructive effect on many other pigments; it was also highly toxic.⁴ Barytic White, also known as constant white or permanent white, had a clogging, pasty nature and was difficult to work with, drying ‘many degrees lighter than when wet’.⁵ White chalk or whiting was considered ‘injurious to many colours in water’ and would probably dry lighter.⁶ Tin white was the basis for white in enamel painting on metal but dried badly and had a tendency to discolour.⁷ Zinc white, a zinc oxide, had been available from the late eighteenth century but was expensive and initially felt to have ‘inadequate body’ in oil and watercolour. Initial efforts to introduce this pigment resulted from a desire to ‘save the lead white workers from the scourge of lead poisoning’.⁸

3 For his use of pigments, see Scott Wilcox, *Sun, Wind and Rain: the Art of David Cox* (New Haven: Yale Center for British Art/Birmingham Museums & Art Gallery in association with Yale University Press, 2008), p. 39.

4 Field, p. 68.

5 Thomas John Gullick and John Timbs, *Painting Popularly Explained* (London: Kent, 1859), p. 293.

6 Field, p. 71. My thanks to Joyce Townsend for her additional comments.

7 *Ibid.*, p. 70. Tin white was the white substance produced when tin was calcined.

8 Hermann Kühn, ‘Zinc White’, in *Artists’ Pigments: A Handbook of Their History and*

By the mid-nineteenth century, lead white was increasingly the subject of scientific investigations and reports. In January 1851, chemist Robert Hunt covered the dangers of lead white production in his article in the *Art Journal*, highlighting the toxic effects on people employed in the lead white works, and the lead colic caused by the absorption of lead dust into the skin.⁹

It is illuminating to discover the lengths to which watercolour artists went to use such a challenging pigment at this time. Paul Sandby (1731–1809) is known to have used white pigments, particularly in some of his works from the 1760s, which are described today as being in 'bodycolour', that is, where 'the pigments are laid on thickly, and mixed with white'.¹⁰ A letter from Sandby dated 18 December 1783, recently discovered in the archives of the Royal Society of Arts, Manufacture and Commerce, reveals for the first time Sandby's choice of white pigment. Aware that 'washed Whiting is apt to turn of a redish [sic] colour, and Flake white black unless it is mixed with other colours', he recorded that instead, 'I have made use for many years of Crabs Eyes which stands its colour perfectly'.¹¹ 'Crabs'-eyes [sic]' are described in a contemporary zoological book as being calcareous masses found in the stomachs of crayfish, and commonly used to treat a variety of medical disorders.¹² Sandby applied his bodycolours over a wash of isinglass (a glue made from the dried swim bladders of fish), mixed with honey, laying in his colours, including 'white, with isinglass [...] making the tint thin with gin, sometimes adding a little gum water'.¹³ By 1892, descendant and collector William Sandby had noted the

Characteristics, vol. I, ed. by Robert L. Feller (Washington: National Gallery of Art and London: Archetype Publications, 2012) (first published 1986), pp. 169–86 (p. 170).

- 9 Robert Hunt, 'On the Applications of Science to the Fine and Useful Arts: The Uses of Science in Ameliorating the Unhealthful Influences of Manufactures, &c', *Art Journal*, 1 January 1851, 6–8. Other articles include 'On the diseases peculiar to those who live by their work: The Diseases of Painters—Painter's colic, and Painter's consumption and Paralysis', *Morning Herald*, Friday 11 September 1838, 6.
- 10 *A Dictionary of Terms in Art*, ed. and illus. by F.W. Fairholt, FSA (London: Virtue, Hall, & Virtue, 1854), p. 79.
- 11 Letter from Paul Sandby about his tests of a watercolour white, 18 December 1783, to Samuel More. RSA/PR/AR/103/10/229 ©Royal Society of Arts and Manufactures Archives—London.
- 12 T.H. Huxley, *The Crayfish: An Introduction to the study of zoology* (London: C. Kegan Paul, 1880), pp. 29–30.
- 13 Paul Sandby's method is described in the diary of his friend, Colonel Gravatt, written between 25 and 31 October 1802, quoted in William Sandby, *Thomas and Paul Sandby: Royal Academicians. Some Account of their Lives and Works* (London: Seeley, 1892), pp. 116–22.

fading and discolouration of many of Paul Sandby's bodycolour pictures, 'not having been varnished, the air, damp, dust and light have in many cases destroyed all the brightness and beauty'.¹⁴

Samuel Palmer (1805–1881) is another figure who used radical techniques in his early works in an attempt to combine white with watercolour, crayon, gums and other media, inspired by his friend William Blake. Palmer's knowledge of the 'chemical complexity' of painting was the result of lifelong experimentation with materials and techniques.¹⁵ His mixed media *Coming from Evening Church* of 1830 is painted on a layer of gesso (chalk or gypsum mixed with glue or gum) on paper, using black ink and pigments, including gold and lead and chalk white, which are sandwiched between several layers of thick animal glue, gum Arabic and honey.¹⁶ In his iconic 'blacks' of the 1820s, Palmer restricted his palette to sepia, Indian ink and lead white, but subsequently the lead white has tarnished in places.¹⁷

J. M. W. Turner (1775–1851), another highly experimental and successful artist, also employed white at times in his watercolours, especially on coloured paper grounds. Highlights were not only achieved by scraping or stopping out, but also, as Joyce Townsend has documented, by sometimes using lead white. In other works such as *Mount Pilatus, from Lake Lucerne* of 1841 (Tate, London), he used dolomite (magnesium carbonate) and chalk, applied in gum medium.¹⁸ Turner also used an early form of zinc white in his *Tummel Bridge* sketchbook of 1801 (Tate, London). Townsend comments: 'Zinc white had been available in a rather transparent form for most of Turner's life [...] It looks very transparent today (which is likely due to a known chemical alteration that can occur within years, or decades, of painting), and it is

14 William Sandby, pp. 123–24.

15 Letter to Philip Gilbert Hamerton, December 1873 in *The Letters of Samuel Palmer*, vol. II, ed. by Raymond Lister, 2 vols (Oxford: Clarendon Press, 1974), p. 884.

16 See the technical analysis of Palmer's 1830 tempera work, *Coming from Evening Church* in *William Blake: The Painter at Work*, ed. by Joyce H. Townsend (London: Tate Publishing, 2003), *Appendix VI: Temperas—Analytical Results*. N03697 Palmer p. 188; in the same volume see Bronwyn Ormsby, Joyce H. Townsend, Brian Singer and John Dean, 'Blake's Use of Tempera in Context', pp. 148–49. For Palmer's techniques and materials, see William Vaughan, Elizabeth E. Barker and Colin Harrison, *Samuel Palmer: Vision and Landscape* (London: The British Museum Press, 2005), pp. 33–41, which identifies his use of lead and chalk white, mixed with different gums and binders.

17 *Ibid.*, p. 35.

18 Joyce H. Townsend, *How Turner Painted: Materials and Techniques* (London: Thames & Hudson, 2022), p. 117.

fortunate that Turner steered clear of it'.¹⁹ Whiting, 'crabs'-eyes', flake or lead white, and the early zinc oxide clearly all provided serious obstacles to the achievement of a permanent artistic vision.

The Arrival of Chinese White

As the nineteenth century progressed, the discovery of new chemical elements such as cadmium and chromium, together with improved manufacturing processes, gradually led to the production of many dazzling new pigments. Between 1800 and 1870, at least thirty-five important new watercolour pigments were introduced.²⁰ A new type of business emerged, initially in London, called the 'artists' colourman', who developed, packaged and sold ready-prepared materials for both artists and amateurs, including radical new moist cakes and tubes of pigment suitable for painting outdoors and on a large scale.²¹

Amongst the many innovative new watercolour pigments developed was one patented in 1834, of which Winsor & Newton were particularly proud. By heating zinc oxide at high temperatures and working together with scientist Michael Faraday, they were able to produce an improved oxide of zinc with increased opacity. They called it 'Chinese white', promoting it widely in their catalogues and painting manuals (Figure 13.1).²² Chinese white, they claimed, combined body and permanence which were far superior to both 'Constant' and 'Permanent' Whites, while also avoiding their clogging or pasty qualities.²³ Furthermore, this white could safely be mixed with all other colours, drying the same tone as when first applied. Priced at one shilling and sixpence, it was an affordable pigment, available in both cakes and bottles, and by 1849 also in tubes.

19 *Ibid.*

20 Fiona Mann, 'Brushing the Surface: The Practice and Critical Reception of Watercolour Techniques in England 1850-1880' (unpublished doctoral thesis, Oxford Brookes University, 2011), pp. 261-65, Appendix II.

21 This business later spread to other cities such as Liverpool, Birmingham and Bristol. See *British Canvases, Stretcher and Panel Suppliers' Marks. Part 12, England outside London* at: https://www.npg.org.uk/assets/files/pdf/research/artists_materials_12_London.pdf.

22 The name is thought to have been derived from the oriental porcelain called Chinese white which was popular in eighteenth-century Europe. See R.D. Harley, *Artists' Pigments c.1600-1835* (London: Archetype Publications, 1982), p. 179.

23 Winsor & Newton, *Catalogue of Materials for Water-Colour Painting, and Sketching, Pencil, and Chalk Drawing* (1849), p. 14.

PERMANENT CHINESE WHITE.

PREPARED ONLY BY WINSOR & NEWTON.

**In Bottles or Tubes, price 1s. 6d. each.**

The White Oxide of Zinc is pronounced by the highest chemical authorities to be one of the most unchangeable substances in nature. Neither impure air, nor the most powerful re-agents, affect its whiteness. It is not injured by, nor does it injure, any known pigments.

It has long been pointed out by chemists as a most desirable substance for the Artists' use, provided sufficient body could be imparted to it; but until lately the want of this necessary quality rendered it unavailable. In Winsor and Newton's preparation, termed Chinese White, this desideratum has been attained. The Chinese White, by combining body and permanency, is rendered far superior to those whites known as "Constant" or as "Permanent" Whites; and not having their clogging or pasty qualities, it works and washes with freedom.

The great body it possesses gives it the property of drying on paper of the same tone as it appears when first laid on, and thus, when used, either alone or in compound tints, it does not deceive the Artist like other whites, by drying up three or four tones higher than when wet.

The Chinese White is peculiarly available in mixing with any of the Water Colours in use, and particularly with the Moist Colours, thereby forming at pleasure an extensive range of body colours of a very superior kind.

*The following Paragraphs are extracted from Mr. HARDING'S
"Principles and Practice of Art"*

"When the Oxide of Zinc, which is prepared by Winsor and Newton under the name of Chinese White, was first put into my hands, some years ago, I applied to one of my friends, whose name as a chemist and philosopher is amongst the most distinguished in our country, to analyse it for me, and to tell me if I might rely on its durability; the reply was, that if it would in all other respects answer the purposes I required of it, I had nothing to fear on account of its durability. "This is an invaluable pigment." "It is hardly possible to overrate the value of "Opaque White in Water Colours when judiciously used."

Fig. 13.1. Illustrated List of Colours and Materials for Drawing and Water Colour Painting, manufactured and sold by Winsor & Newton, 38, Rathbone Place, London", attached at the back of the manual by Thomas Rowbotham and Thomas L. Rowbotham, *The Art of Landscape Painting in Water Colours* (London: Winsor & Newton, 1850), p. 12.

Bachhoffner's Attack on Chinese White

Not everyone was convinced by Winsor & Newton's impressive claims, however. In October 1837, the scientist and colourman George Bachhoffner published a lengthy treatise, *Chemistry as Applied to the Fine Arts*, based on a series of popular public lectures he had given to artists. In it, he declared that the zinc oxide was 'seldom very pure', and continued:

It is occasionally employed as a white pigment, but I have reason to believe with little success, being much inferior both in body and colour to the whites with a base of lead, and but little, if any superior to them in durability. The Chinese white spoken so highly of by some artists is, I have reason to believe, manufactured from this oxide.²⁴

Bachhoffner's treatise was dedicated to the important patron of art, the 3rd Earl of Egremont, and was distributed amongst over 140 subscribers, whose names were listed prominently at the front of the publication.²⁵ These included the Artist's Society at Clipstone Street and illustrious figures such as Charles Locke Eastlake and Henry Sass. Many of the subscribers were also important customers of Winsor & Newton, who were understandably outraged. In November 1837, William Winsor and Henry Newton responded to Bachhoffner in an open letter, accusing him of making 'a vague unsupported assertion [...] which is at variance with the highest chemical authorities'—an assertion which they felt might cause unnecessary alarm amongst existing users.²⁶ Furthermore, as they said that Chinese white was well known to be 'our exclusive manufacture, the name being merely a distinctive one adopted by us', they saw Bachhoffner's accusation as a direct attack on the Winsor & Newton product.²⁷ In their defence, they quoted George Field's statement in his *Chromatography* that zinc white is amongst 'the best and most permanent pigments not [...] liable to change by the opposite influences of shade,

24 George H. Bachhoffner, *Chemistry as Applied to the Fine Arts* (London: J. Carpenter, 1837), p. 116.

25 George O'Brien Wyndham, 3rd Earl of Egremont, December 1751–November 1837.

26 Wm Winsor and Hy Newton, *Remarks on the White Pigments used by Water-Colour Painters, being a letter addressed to G. H. Bachhoffner, Esq, Lecturer on Chemistry, &c &c, relative to a passage in his treatise on "Chemistry as Applied to the Fine Arts"* (London, 1837), p. 5, located in the Eastlake Library, National Gallery, London.

27 *Ibid.*, p. 4.

sulphuretted hydrogen, damp, and impure air; nor by the action of lead or iron' and that it is 'perfectly durable in water and oil'.²⁸

By way of further argument, Winsor & Newton went on to discuss and criticise at length a product 'manufactured and sold by yourself, to which our attention has been directed' and which they knew to have been 'extensively used on works of considerable value', namely 'G. H. Bachhoffner's Flemish White'.²⁹ Having carried out their own extensive testing on the pigment, they confirmed it to be a sulphate of lead, which blackened on 'being moistened with hydrosulphuret of ammonia'.³⁰ They triumphantly concluded that the 'extracts from your own work, at page 6, save us the trouble of remarking on the extreme impropriety of offering to the artist a pigment so destructive'.³¹

Bachhoffner's attack on Winsor & Newton's Chinese white had thus backfired spectacularly, resulting instead in his own lead white pigment being firmly discredited. Winsor & Newton emerged victorious, and before long, Chinese white was a huge success. The updated 1869 posthumous edition of *Chromatography* finally concluded that Chinese white in watercolour was the 'one white pigment which approaches perfection'.³²

Watercolour Manuals: 'Legitimacy' of Use

Winsor & Newton had won their battle against Bachhoffner, but it was not all smooth sailing for their new product over the ensuing few years. New pigments were received with some caution, particularly in the highly conservative field of watercolours, where permanence and durability were becoming increasingly serious topics of discussion. As has already been mentioned, the use of an opaque white pigment in traditional tinted watercolours had been vigorously discouraged in the past. Yet the new drive towards the depiction of detail and high levels of finish during the second half of the nineteenth century, allowing works

28 *Ibid.*, p. 10, quoting Field, pp. 187 and 70.

29 *Ibid.*, p. 16.

30 *Ibid.*, pp. 17–18, including footnotes 2–5.

31 *Ibid.*

32 Thomas W. Salter, *Field's Chromatography; or Treatise on Colours and Pigments as Used by Artists. An Entirely new and practical edition* (London: Winsor & Newton, 1869), p. 80.

in watercolour to compete directly with those of oils on the walls of exhibitions, encouraged the adoption of revolutionary and vigorous new techniques. Hatching, stippling, blotting-in, scraping-out, sponging and impasto, as well as the application of different fixatives, gums and megilps, were increasingly popular using opaque pigments on new, more resilient types of paper, board and, even more radically, on canvas supports—notably by Edward Burne-Jones, as will be explored later.³³

A range of affordable little painting manuals and handbooks aimed at the amateur began to flood the market from the 1850s, guiding artists on the techniques and materials for use in different media, especially watercolours. Manuals such as Mrs William Duffield's *The Art of Flower Painting* (1856) and Aaron Penley's *The English School of Painting in Water Colours* (1861) acknowledged Chinese white as a welcome and successful addition to the watercolour palette. Sidney Whiteford's work, *A Guide to Figure Painting in Water-Colours* (1870), further noted the 'very superior results' afforded by spreading 'Body-White' over the paper to form 'a slightly absorbent and very luminous ground', which was allowed to dry and then scraped flat with a knife. Whiteford, who had studied under William Henry Hunt, was also at pains to acknowledge the fragility of works painted on such a white ground, as 'portions of thick pigment, when quite dry, are very easily detached'.³⁴

In the meantime, the speed at which the new white was adopted by artists can be judged by the significant changes made to successive editions of George Barnard's manual, *Theory and Practice of Landscape Painting*. In 1855, when the manual was first published, Barnard advised that the artist should avoid 'as much as possible the employment of opaque body colour', as it would 'detract from the transparency of the work'.³⁵ By the time the second edition was published just three years later, Barnard had added an entirely new four-page section on the subject, commenting:

Since the publication of the first edition of this work, the use of Chinese white or oxide of zinc has greatly increased; and the constant recurrence

33 Works painted by Burne-Jones in watercolour onto canvas supports include the *Triumph of Love: Fortune, Fame, Oblivion, Love*, 1871; and his six *Days of Creation* paintings, 1870–1876 (Harvard Art Museums/Fogg Museum).

34 Whiteford, pp. 38–39.

35 George Barnard, *The Theory and Practice of Landscape Painting in Water-Colours* (London: William S. Orr, 1855) p. 107.

of this mode of gaining effects by artists of established reputation, in fact, by nearly all the first men of the school, has doubtless caused these demands.³⁶

Stating his intention to 'dismiss at once the term *illegitimate*', Barnard was also careful to include discussion of both the advantages and disadvantages of the technique.³⁷

Other manuals also felt it important to present both the strengths and shortcomings of the pigment to their readers. In 1859, the authors of the manual *Painting Popularly Explained* recognised that 'few subjects in art have been more contested than that of legitimacy of practice in water-colour painting'. They contrasted the opinion of Frank Howard with that of the famous critic John Ruskin.³⁸ On the one hand, in his *Colour as a Means of Art*, Howard lamented that by 'the use of opaque body-colours and a similar method of working, to imitate the effect of oil-painting [...] the purity of one art is lost without attaining the force of the other'.³⁹ Ruskin, on the other hand, was 'inclined to think there should be no touch without white, and [...] speaks highly in praise of body colour'.⁴⁰

Ruskin's influential manual *The Elements of Drawing*, published in 1857, advocated the close study of nature and the pursuit of detail. According to Ruskin, 'body-colour is [...] infinitely liker nature than transparent colour [...] always truer than the most finished [...] work in transparent tints can ever be'.⁴¹ He advised using:

Chinese white, well ground, to mix with your colours in order to pale them, instead of a quantity of water [...] This mixing of white with the pigments, so as to render them opaque, constitutes *body-colour* drawing as opposed to *transparent-colour* drawing [...] It is just as legitimate as oil-painting, being [...] the same process, only without its uncleanness, its unwholesomeness, or its inconvenience.⁴²

36 Barnard, 2nd edn (London: Hamilton, Adams, 1858) p. 125.

37 *Ibid.*, p. 125. Italics appear as used in the original text.

38 Frank Howard, *Colour as a Means of Art* (London: Joseph Thomas, 1838), pp. 28–30; John Ruskin, *The Elements of Drawing* (London: Smith, Elder, 1857), quoted in Gullick and Timbs, pp. 296–97.

39 Howard, pp. 28–30.

40 Gullick and Timbs, p. 297.

41 Ruskin, *The Elements of Drawing*, p. 204.

42 *Ibid.*, pp. 201–02.

The Artist and Chinese White

So what did artists choose to do when faced with such opposing opinions? Did they rebel against tradition, or did they comply with the dogmatic demands of highly conservative societies? If they rebelled, would this bring them success or merely render them outcasts from the art world? Ruskin was just one of many practising artists who accepted the challenge and not only promoted the opaque method of painting, but also adopted it in his own work. Technical analysis carried out recently by Tea Ghigo on Ruskin's watercolours at the Ashmolean Museum has confirmed that Chinese white was one of the pigments he used, notably in his glorious *Study of a Kingfisher*. Her chapter in this volume gives further details of her discoveries.

For Ruskin, a large watercolour exhibited in 1856 by John Frederick Lewis (1804–1876), which exploited zinc white to portray the effect of strong sunlight on colour, ranked as 'among the most *wonderful* pictures in the world'.⁴³ This was Lewis's four-and-a-half-foot wide work, *A Frank Encampment in the Desert of Mount Sinai. 1842–The Convent of St Catherine in the Distance* (Figure 13.2), commissioned by British aristocrat Viscount Castlereagh during Lewis's ten-year stay in Egypt. Recent investigation has identified areas where zinc white was applied by Lewis, showing up as luminous areas in the UV image.⁴⁴ From 1853, Lewis had been buying Chinese white from the colourman Charles Roberson.⁴⁵ Close examination of the picture confirms areas where the bright red pigment of the robe of the standing man has flaked off to expose the white paint layer beneath. *The Times* expressed disappointment with Lewis's 'over elaboration' and his use of 'detail that almost rivals photography', mainly achieved by the use of 'opaque colour'.⁴⁶ It is perhaps extraordinary that Lewis painted such a brilliant work using Chinese white the year after being appointed President of the highly conservative Society of Painters in Water Colours (SPWC).

43 John Ruskin, 'Academy Notes', 1856, in *The Complete Works of John Ruskin*, vol. XIV (1904), Library edn, ed. by E.T. Cook and Alexander Wedderburn, 39 vols (London: George Allen, 1903–1912), pp. 41–87 (p. 74).

44 A UV image was taken by Theresa Fairbanks Harris, Yale Center for British Art, showing areas of zinc white.

45 Cambridge, Hamilton Kerr Institute, Roberson Archive (hereafter cited as Roberson Archive HKI): HKI MS 245-1993, pp. 297–98; MS 246-1993, p. 360; MS 247-1993, pp. 30–32.

46 'The Society of Painters in Water Colours', *The Times*, 28 April 1856, p. 12.



Fig. 13.2. John Frederick Lewis, *A Frank Encampment in the Desert of Mount Sinai. 1842–The Convent of St Catherine in the Distance*, 1856, watercolour, bodycolour and graphite on paper mounted on board, 26 ¼ x 53 ½ in (66.7 x 135.9 cm), Yale Center for British Art, Paul Mellon Collection, B1977.14.143

Lewis's work sold to both dealers, such as McLean and Agnew,⁴⁷ and to private collectors. *The Hhareem* (private collection) caused a sensation when exhibited in 1850, selling for £1000.⁴⁸ His intricately painted watercolours were widely exhibited, notably at the Crystal Palace (1865), the Paris Universal Fairs (1855 and 1878) and the Manchester Art Treasures Exhibition (1857). Yet his minutely detailed technique was laborious, and he would take months to complete one picture.⁴⁹ By 1857, Ruskin was bemoaning the amount of toil required to paint Lewis's minutely patterned *Hhareem Life, Constantinople* (Laing Art Gallery, Newcastle upon Tyne), asking, 'Why don't you paint in oil only now?'⁵⁰ Lewis resigned his presidency in 1858, explaining in a letter to the secretary of the society that 'I felt that work was destroying me. And for what?—to get by water colour art 500l a year, and this too when

47 Mann, 'Brushing the Surface', CH 3, "John Frederick Lewis 1804-1876", pp. 87–88.

48 Major-General Michael Lewis, *John Frederick Lewis RA 1805-1876* (Leigh-on-Sea: F. Lewis, 1978), p. 26.

49 Pictures exhibited include *The Hhareem* (Paris Universal Exh., 1855); *A Halt in the Desert* (Paris Universal Exh., 1855); *Easter Day at Rome—Pilgrims and Peasants of the Neapolitan States awaiting the Benediction of the Pope at St Peter's* (Manchester Art Treasures Exh., 1857); *Caged Doves* (Crystal Palace, 1865); *And the Prayer of Faith Shall Save the Sick* (Paris Universal Exh., 1878) – for details see Major-General Lewis, pp. 77, 83, 92, 97.

50 Letter John Ruskin to J.F. Lewis, dated 'Tuesday' (1856), coll. Maj-Gen. M. Lewis, quoted in Lewis, p. 28.

I know that I could with less labour get my thousand' (by painting in oil).⁵¹ Lewis had confessed to a friend that 'I find water colour to be [so] thoro'ly *unremunerative* that I can stand it no longer – it is all, all always, rolling the stone up the hill – no rest, and such little pay!'⁵²

Chinese white was also favoured by a young generation of illustrators who initially began producing designs for wood engraving for popular illustrated magazines and journals. Frederick Walker (1840– 1875), Myles Birket Foster (1825–1899) and John William North (1842–1924) all started out as illustrators, producing black and white drawings often directly onto dense end-grain blocks of box wood, which were then engraved and printed. Traditionally, a 'coat of "whiting" chalk or brick-dust' would have been applied to the wooden block to provide a 'tooth' 'that would more readily take a pencil mark'.⁵³ The new Chinese white was soon adopted for this purpose. When Birket Foster progressed to watercolour painting in the late 1850s, depicting idyllic scenes of a rapidly disappearing rural life, he employed a similar technique, working at times in 'colour over the smooth and brilliant surface given by Chinese white laid upon paper'.⁵⁴ In his sketchbooks the opaque white was sometimes also used as a corrective tool, allowing him to paint over parts of the original.⁵⁵ Foster purchased contemporary watercolour paintings which also strongly featured Chinese white, such as J. F. Lewis's luminous smaller version of *The Hareem* (Victoria and Albert Museum, London). Foster's work sold quickly at exhibitions and through dealers such as Agnew, and Christie, Manson & Woods. While critics at times considered Foster's works chalky in appearance, with a 'hard, cold finish', 'not a little

51 Letter J.F. Lewis to J.J. Jenkins, Secretary of the Old Water-Colour Society, 5 February 1858 (RWS J57/54), J.L. Roget, *The 'Old Water-Colour' Society*, vol. II (London: Longmans, Green, 1891), p. 147. After the formation of a rival society, the New Watercolour Society, in 1831, the SPWC subsequently became also widely known as the 'Old Water-Colour Society'.

52 Letter J.F. Lewis to Thomas Griffith, dated Walton 3 February 1858, quoted in Lewis, p. 30.

53 Ian Bain, *The Watercolours and Drawings of Thomas Bewick and his Workshop Apprentices*, vol. I (London: Gordon Fraser, 1981), p. 56. Thomas Bewick (1753–1828).

54 Hardie, *The Victorian Period*, vol. III (London: B. T. Batsford, 1968), p. 112. For a list of the watercolour pigments used by Foster, see *Magazine of Art*, February 1901, p. 186: 'Birket Foster's Palette'. Chinese white is listed.

55 See Birket Foster sketchbook P5-1922, V&A, London: sketches for *The Donkey that wouldn't go*.

like porcelain', his commercial success brought him financial rewards and a substantial new home in Witley, decorated in the latest style by Morris, Marshall, Faulkner & Co.⁵⁶

The young illustrator Frederick Walker also defiantly adopted Chinese white in his watercolours despite the clear disapproval of the Society of Painters in Water Colours, of which he only became an associate member in 1864.⁵⁷ 'What *would* "the Society" say if only it could see me?' he scrawled in 1865 beneath a cartoon of himself laboriously squeezing large quantities of white pigment from an enormous tube.⁵⁸ Highly sensitive to criticism and only twenty-five years old at this time, Walker believed strongly enough in his technique to persevere with it in the face of such strong opposition. His method was considered 'extremely heterodox' in some quarters, with Ruskin openly attacking Walker's style in an 1876 letter to Henry Stacy Marks: 'Here is Walker [...] inventing a semi-miniature, quarter fresco, quarter wash manner of his own [...] which betrays his genius into perpetual experiment instead of achievement'.⁵⁹ Yet Walker's work was very popular, as noted by the famous engravers George and Edward Dalziel, who owned several of his watercolours, including *Philip in Church*, which was in demand 'for exhibition in the provinces or abroad' and won the Birmingham Society of Artists' gold medal for the best watercolour in their 1864 exhibition.⁶⁰

There was, however, another, very practical reason for the use of Chinese white priming by both Walker and his friend John William North at this time. Machine-made papers introduced by the industrial

56 'Society of Painters in Water Colours', *Athenaeum*, 26 April 1862, p. 567; and 'Birket Foster's Pictures of English Landscape', *Athenaeum*, 22 November 1862, p. 666.

57 Walker went on to become a full member of the SPWC.

58 The tube bears the name of the colourman Thomas Eatwell of 49 Dorset Street, London, 1855–1876, who also supplied J.E. Millais, Holman Hunt and Samuel Palmer with materials. See National Portrait Gallery, *British Artists' Suppliers, 1650–1950*, E at: https://www.npg.org.uk/collections/research/programmes/directory-of-suppliers/suppliers-e?_gl=1*11ol0vs*_up*MQ..&gclid=Cj0KCQjww5u2BhDeARIsALBuLnOJT0UTgueNoF-I3vchxP3hagAxLwWHGDVcntA5xbTKA-CgbJhKEyAaAjCcEALw_wcB.

59 Ruskin, 'The Frederick Walker Exhibition' (1876), in Ruskin, *Works*, vol. XIV (1904) ('Academy notes on Prout and Hunt and other art criticisms, 1855–1888'), pp. 339–48, (p. 340).

60 George Dalziel, *The Brothers Dalziel: A Record 1840–1890* (London: B. T. Batsford, 1978, reprint) p. 204.

revolution were increasingly replacing the high-quality hand-made papers preferred by artists. Often made from cheaper raw materials such as wood pulp which was processed using bleach, this had a negative effect on the stability of the paper, as Field noted.⁶¹ Walker's excessive use of Chinese white in his earlier watercolours was considered necessary to compensate for a 'defect in the paper'.⁶² 'A little water colour I began yesterday, I was obliged to destroy, because the paper was so impossibly bad', wrote Walker to his sister Fanny in 1868.⁶³ Thus, Chinese white was being used to mask falling standards in paper quality as well as to produce careful details and textured effects, such as those in *The Gondola* (Birmingham Museums and Art Gallery) of 1868,⁶⁴ which met with severe criticism in the Winter Exhibition of the Society of Painters in Water Colours that year:

The pigments are laid on thick, as in the *impasto* of *tempera*; this method has more singularity than merit; the painter is wholly defiant of opacity; when he paints a wall, he lays on mortar as liberally as a mason, and thus the wall is a wall accordingly.⁶⁵

Such textured application of thick bodycolour is also evident in works by Walker's friend and fellow illustrator John William North, such as *Halsway Court* (British Museum), where it is used to emphasise the rough plaster surface of the old house depicted, which was under threat of imminent and damaging 'improvements' by its owner, including the removal of the traditional plaster layer from the framework.⁶⁶

The practice of white priming is one generally now associated with

61 Field, *Chromatography*, p. 215: 'if the bleaching acid employed in manufacturing remains ever so little in the paper, both the texture and the colours will suffer in permanence'.

62 J.W. North's description of Walker's watercolour technique in John George Marks, *Life and Letters of Frederick Walker ARA*, London: Macmillan, 1896) p. 169.

63 Marks, p. 149.

64 Frederick Walker, *The Gondola*, 1868, watercolour on paper, 13 x 17 ¾ in (33.1 x 44.9 cm) Birmingham Museums and Art Gallery.1918P47, <https://dams.birminghammuseums.org.uk/asset-bank/action/viewAsset?id=11718&index=0&total=22&view=viewSearchItem>, photo by Birmingham Trust.

65 'Society of Painters in Water Colours', *Art Journal*, 1 January 1869, p. 11.

66 Newall, in Allen Staley and Christopher Newall, *Pre-Raphaelite Vision: Truth to Nature* (London: Tate, 2004), p. 201, provides an interesting commentary on the 'desecrations inflicted upon Halsway' and the 'anti-scrape' campaign championed by William Morris from 1877.

the Pre-Raphaelites and oil-painting, but by 1870 this method was said to be widely favoured by watercolourists, thanks to the opacity, stability and permanent qualities of the new Chinese white, which could be spread over the paper to form 'a slightly absorbent and very luminous ground', as one manual explained.⁶⁷ There is some evidence that Dante Gabriel Rossetti and his pupil and muse, Elisabeth Siddal, used a zinc white preparatory layer for some of their watercolours in the late 1850s and 1860s.⁶⁸ Samuel Palmer was embracing this technique after 1846 in his later works, having realised that he needed a 'NEW STYLE. SIMPLE SUBJECT; BOLD EFFECT' if his watercolours were to find buyers.⁶⁹ 'A white priming', wrote Palmer, 'is to a brilliant picture, what the outside daylight is to a stained glass window'.⁷⁰ The colours he recommended to his pupil Louisa Twining between 1856 and 1864 included bright new nineteenth-century pigments such as cadmium yellow, extract of vermilion, emerald green, orange chrome and zinc white, used in tube form.⁷¹ These colours are also found in works by Rossetti and Siddal dating from the same period.⁷² Palmer's later adoption of a Chinese white priming, and his expanding use of bright pigments to create what he called a 'well-head of dazzling light', is evident in his work *The Prospect* of 1881 (Ashmolean Museum), commissioned by Leonard Rowe Valpy, Ruskin's solicitor.⁷³

67 Whiteford, p. 38.

68 Joyce Townsend has generously provided this information, taken from her technical studies for *The Rossettis* exhibition at Tate, not yet published.

69 A.H. Palmer, *The Life and Letters of Samuel Palmer* (London: Seeley, 1892) p. 85. Palmer's own use of capital letters emphasised important points in his personal memorandum book.

70 *The Letters of Samuel Palmer*, vol. II, ed. by Raymond Lister, 2 vols (Oxford: Clarendon Press, 1974). p. 890: Palmer to P.G. Hamerton, December 1873.

71 'Notes taken during the Lessons in Watercolour Painting from Samuel Palmer to Louisa Twining', 1856, unpublished manuscript, Ashmolean Museum, Oxford, 1954.131.2; and letter from Palmer to Twining dated 22 November 1864 in Lister, II, p. 717. See also letter to Louisa Twining 22 November 1864, pp. 265–66: 'Use the zinc-white (in tube) freely, whenever it is of use; only mind (and this is very important) when you use heightening lights [...], do the lights first, delicately and sharply with white; when dry, add the colour'.

72 Communication generously provided by Joyce Townsend, also taken from her technical studies for *The Rossettis* exhibition at Tate, not yet published.

73 Marjorie Shelley, 'Palmer's Materials and Techniques: The Later Years', in Vaughan, Barker and Harrison, pp. 37–41 (pp. 38–40).

New Exhibiting Spaces for Watercolours

Chinese white was thus being widely and successfully exploited by many avant-garde artists during this period, despite ongoing criticism in conservative quarters. Fiercely determined to raise the status of the medium to equal that of oils, these watercolourists increasingly employed bodycolour to produce strongly coloured, detailed works of great brilliancy, particularly suited to display on the walls of exhibitions and in the tastefully decorated homes of wealthy new industrial patrons.

With the Royal Academy historically skyng watercolours in their exhibitions or placing them away from oils in dimly lit rooms, and the Society of Painters in Water Colours only permitting works to be exhibited by a limited number of elected members, artists sought new spaces to show off their paintings. Two progressive new venues opened their doors in 1865 and 1877, dedicated to the display of experimental works, especially those by young artists who were unable or unwilling to exhibit elsewhere. The first watercolour exhibition in 1865 at the new Dudley Gallery—where membership was not required, but where works continued to be hung crowded together in one small room—created a sense of shock, with one critic reeling from the 'general sense of arsenical or *peagreen*' and of lavender, pink, '*flaming red* and *canary yellow*'.⁷⁴ Conservative critics from the *Art Journal* and the *Graphic* commented on the 'tentative and experimental' nature of the works shown there, by artists who exhibited both 'originality of [...] ideas' and a 'freedom from hackneyed conventions'.⁷⁵ When North's *Halsway Court* watercolour, exhibited under the title *The Old Bowling Green*, was shown there in 1867, the *Art Journal* critic objected that 'opaque is used here in unmitigated manner. Indeed, we know of no gallery where body colour is to be found in so great a quantity as the Dudley'.⁷⁶

In 1877, Sir Coutts Lindsay's sophisticated and sumptuously decorated Grosvenor Gallery opened in an exclusive shopping area of London. Lindsay devoted this purpose-built space to the work of

74 'The First General Exhibition of Water-Colour Drawings', *Pall Mall Gazette*, 28 February 1865, 7.

75 'Dudley Gallery: Fifth General Exhibition of Drawings', *Art Journal*, 1 March 1869, 81; *Graphic*, 12 February 1870, 247.

76 'The Third General Exhibition of Water-Colour Drawings: Dudley Gallery', *Art Journal*, 1 March 1867, p. 88.

artists whose 'ideas and method of embodying them are strange to us' and who displayed 'eccentricity'.⁷⁷ Here watercolourists were treated with respect, their pictures displayed in a dedicated room, hung with green silk, surrounded by marble pillars and illuminated with the latest electric lighting. Exhibition was by invitation, works by each artist being 'hung all together or in one or two separate groups, without the crowding of canvases, that prevailed at other expositions'.⁷⁸ Aesthetic paintings by artists such as Edward Burne-Jones, Albert Moore and James McNeill Whistler lined the walls, bemusing the uneducated with their eccentricity and prompting the *Punch* critic to brand the gallery 'St Luke's Asylum for Lunatic Limners'.⁷⁹

Burne-Jones's trail-blazing watercolours featured at both the Dudley and the Grosvenor galleries, following his resignation from the Watercolour Society in 1870, where his pigments had been deemed 'opaque with a vengeance [...] in substance and surface might almost be mistaken for oil'.⁸⁰ His *Triumph of Love* series (private collection), shown at the Dudley in 1872, was painted in bodycolour on canvas, further blurring the boundaries between the two media.⁸¹ 'Technically to be called water-colour, the method and effect of the painting, on canvas and with thick body-colour, are practically scarcely to be distinguished from those of oil', gasped one critic.⁸²

In 1877, the first Grosvenor exhibition gave prominence to Burne-Jones's six beautiful decorative panels, *The Days of Creation*, again painted in watercolour onto canvas.⁸³ The artist quickly became a cult figure

77 'The Grosvenor Gallery', *Art Journal*, August 1877, p. 244.

78 Colleen Denney, *At the Temple of Art: The Grosvenor Gallery, 1877-1890* (Madison, NJ: Fairleigh Dickinson University Press; London: Associated University Presses, 2000), p. 50.

79 'Our Guide to the Grosvenor Gallery', *Punch*, 22 June 1878, 285. A 'limner' is defined by Fairholt, p. 269 as 'the old term for an artist or delineator, but chiefly restricted to portrait or figure painting'. In Elizabethan times, it was particularly applied to miniature portrait painters, such as Nicholas Hilliard (1547-1619).

80 'Society of Painters in Water Colours', *Art Journal*, 1 June 1870, 173.

81 For more information, see Fiona Mann, 'A "born rebel": Edward Burne-Jones and Watercolour Painting 1857-80', *Burlington Magazine*, October 2014, pp. 657-64.

82 'The Dudley Gallery', *Pall Mall Gazette*, 13 February 1872, 10.

83 Edward Burne-Jones, *The Days of Creation: The Fifth Day*, 1870-1876, watercolour, gouache, shell gold, and platinum paint on linen-covered panel prepared with zinc white ground, 40 ¼ x 14 1/8 in (102.2 x 35.9 cm), Harvard Art Museums/Fogg Museum, bequest of Grenville L. Winthrop. 1943.458. Photo: ©President and Fellows of Harvard College, <https://hvard.art/o/298117>.

there. Colourman Charles Roberson supplied Burne-Jones with canvas panels for the six works, pre-primed with Chinese white watercolour paint, as well as tubes and pans of Chinese white and cakes of shell gold and aluminium.⁸⁴ Encased by the artist together in a huge, gilded frame reminiscent of a Renaissance altarpiece, *The Days of Creation* were sold for £2000 to his devoted patron William Graham, who had his London home completely redecorated to accommodate them.⁸⁵

Conclusion

Where was watercolour to go from here? So much had been achieved in the face of controversy and criticism since the arrival of the new white pigment, which had proved its durability and delivered the early promises made by Winsor & Newton. However, by 1874, the *Art Journal* noted with concern that the 'revolution in technical method' had 'left the art in a somewhat disturbed state, so that young painters of the present time seem scarcely decided as to the way in which outward nature is to be interpreted', striving for elaboration at the expense of the effect of overall harmony.⁸⁶ Now that watercolour had been transformed into a powerful medium capable of expressing texture, pattern, intricate detail and dazzling effects—a worthy competitor to its rival, oils—there was perhaps little more left to prove. Christopher Newall has commented that after 1880, 'the debate about the status and usefulness of watercolour became less intense and prejudices against the medium were largely overcome'.⁸⁷ Even Ruskin's opinion had changed over time, reflecting shifting attitudes away from the use of intricate detail during the 1870s. Ruskin's 1857 advocacy of Chinese white and bodycolour

84 Roberson Archive HKI MS 247-1993, pp. 158 and 379 (5 March 1870 and 14 January 1873: 'cake Aluminium'; and 'cakes Gold & Allum^m'; and 25 March 1873: 'tubes & pans C White').

85 £2000 is noted on the Harvard Art Museum website: <https://harvardartmuseums.org/collections/object/303460>. Oliver Garnett, 'The Letters and Collection of William Graham—Pre-Raphaelite Patron and Pre-Raphael Collector,' *The Volume of the Walpole Society*, 62 (2000), 145–343 (p. 167) states that William Graham originally agreed to pay £1000 for the series. For details of the aedicular frame, with decorative frieze, see <https://theframeblog.com/2012/12/06/a-final-look-at-pre-raphaelite-frames/>.

86 'Dudley Gallery', *Art Journal*, 1 March 1874, p. 68.

87 Christopher Newall, *Victorian Watercolours* (London and New York: Phaidon Press, 1987), p. 119.

quickly turned into condemnation of such laborious techniques, evident from the irritation he expressed over Lewis's *Hhareem Life, Constantinople* and his 1876 criticism of Walker. For some, it was time again for change, a return to the simplicity of the old style.

Although Chinese white was introduced in oil in 1860, it did not become widely used by oil painters, as it was deficient in body and hiding power in this medium and was subject to cracking.⁸⁸ Chinese white remained mainly the preserve of the art of watercolour, where it is still widely used today. In 1879, the *Magazine of Art's* review of the watercolour exhibition at the Grosvenor Gallery summarised the impact of Chinese white on the evolution of watercolour practice in England:

The first aquarellists [...] seemed scarcely to have practised the same art as the painters of our time. In the infancy of water-colour, slight pencil sketches, washed freely with transparent colour, which was not even intended to conceal the pencil marks, gave little more than hints or impressions of natural effects [...] finally, in our day, the original genius and intention of water-colours have been forgotten, and a beautiful, minute, imitative art has been evolved, which contests the distinctive merits of oil-painting. It has, indeed, been rather revolution than evolution, and the whole change may be ascribed to the use of opaque white – 'body-colour'.⁸⁹

The *Magazine of Art* review acknowledges the revolutionary impact made on English watercolour painting techniques by the stable, non-toxic, permanent and opaque Chinese white, since its introduction in 1834. Freeing artists from the restrictions of traditional practice, it allowed them to work from dark to light on a variety of unconventional background supports of increasing size. Their brilliant, detailed and textured works so successfully came to rival oils at fashionable exhibition spaces that they were sometimes mistaken for oils. Such material innovations served to raise the status of the medium of watercolour and paved the way for future experimentation in the field.

88 Leslie Carlyle, *The Artist's Assistant: Oil Painting Instruction Manuals and Handbooks in Britain 1800–1900 with Reference to Selected Eighteenth-Century Sources* (London: Archetype Publications, 2001), p. 173.

89 'Water-Colour Drawings at the Grosvenor Gallery', *Magazine of Art*, 1879, p. 30.

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14. Colour on Trial: Concerns about the Quality of Artists' Pigments

Kathrin Kinseher

The Nineteenth-Century Colour Turn

During the nineteenth century, the production and supply of pigments underwent immense changes on a scale never seen before. The discovery of new, synthetic, inorganic pigments based on chrome, cobalt, cadmium, arsenic and zinc enlarged the supply of mineral pigments. The rapid expansion of coal tar dyes followed in the second half of the century after the young chemist William Perkin accidentally discovered a purple synthetic aniline dye in 1856 from coal tar chemicals, which was named after the French for the mallow wildflower, *mauve* (on the naming of the new anilines in relation to a longer history of dyes, see Marie-Anne Sarda's chapter in this volume). Following the increase in the development of new colourants, the coal tar dye industry explored new sales markets in fields including fashion, paper and printing, interior design and food, hugely impacting the visual world of consumers. Art and culture were caught up in a 'colour revolution'.¹ In artists' oil paints, shades of colour became available in a huge number of nuances, premanufactured in tubes. The range of pigments changed from primarily natural pigments obtained from minerals, plants and animals, to new, artificially-made chemical ones, starting with the invention of synthetic ultramarine

1 Matthew Winterbottom and Charlotte Ribeyrol, "'The Age of Colour': Victorian Britain (1837–1901)", in *Colour Revolution. Victorian Art, Fashion and Design*, ed. by Charlotte Ribeyrol, Matthew Winterbottom and Madeline Hewitson (Oxford: Ashmolean Museum, 2023), pp. 17–29.

during the late 1820s in both Germany and France.²

New synthetic inorganic pigments such as zinc white, chrome yellow and chrome red, ultramarine blue and cobalt blue, cobalt violet, viridian and emerald green became established in the catalogues of artists' colourmen and were introduced into nineteenth-century artists' palettes, alongside synthetic organic lakes including mauve, magenta, Chinese orange and alizarin.³

In contrast to the textile production industry where synthetic dyes almost replaced natural ones, their use in artists' paints and house paints was met with concerns about poor permanence and colour fastness. Moreover, aesthetic concerns about vivid, unnatural and unpleasant colours were brought forward. John Ruskin, for example, disliked aniline colours.⁴ A list of pigments he recommends in his texts refers to inorganic and natural organic pigments which were classified as permanent in Field's *Chromatography*.⁵ Similarly, James McNeill Whistler faulted the use of mauve as well as synthetic ultramarine in a painting by his American colleague William Turner Dannat, shown at the exhibition of the Société Nationale des Beaux-Arts in Paris in 1891.⁶ William Morris complained of the displacement of natural vegetable dyes by synthetic ones. The disappearance of natural madder in favour of synthetic alizarin was the focus of William Holman Hunt's lecture at the Society of Arts in 1880 and was also taken up by the Austrian painter and stage designer Josef Hoffmann at the 1893 Munich congress on painting technique.⁷

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- 2 Laura Anna Kalba, 'Technology and Trade: Chemistry, Capitalism, and the Materialities of Modern Color Theory', in *A Cultural History of Color in the Age of Industry*, ed. by Alexandra Loske (London, New York, Oxford, New Delhi, Sydney: Bloomsbury Academic, 2021), pp. 53–73 (p. 59), https://materialarchiv.ch/de/ma:material_2169?type=all.
 - 3 Leslie Carlyle, *The Artist's Assistant: Oil painting Instruction Manuals and Handbooks in Britain, 1800–1900, with Reference to Selected Eighteenth-Century Sources* (London: Archetype Publications, 2001), pp. 157–60, 465–543.
 - 4 Winterbottom and Ribeyrol, 'The Age of Colour', p. 26.
 - 5 George Field, *Chromatography, or, A Treatise on Colours and Pigments, and of Their Powers in Painting, &c.* (London: Charles Tilt, 1835); Tea Ghigo, Michele Occhipinti, Andrew Beeby, Kelly Domoney and Daniel Bone, 'Concerns over colour durability in the nineteenth-century industrial revolution: insights from John Ruskin's teaching collection', *Heritage Science*, 11.168 (2023); and Tea Ghigo's chapter in this volume.
 - 6 Matthew Winterbottom, "'The Triumph of Colour": the Synthetic Colour Revolution', in *Colour Revolution. Victorian Art, Fashion and Design*, ed. by Charlotte Ribeyrol, Matthew Winterbottom and Madeline Hewitson (Oxford: Ashmolean Museum, 2023), pp. 87–101 (p. 100); <https://www.whistlerpaintings.gla.ac.uk/catalogue/display/?mid=y239&xml=tec>.
 - 7 *Ibid.*, pp. 99–100; Deutsche Gesellschaft zur Beförderung rationeller Malverfahren,

Intense, synthetic lake pigments were not only offered in one-pigment shades but in mixtures with traditional pigments to enhance such colours. They played a significant role in the adulteration and manipulation of artists' pigments.⁸ The various changes made to pigments through adulteration and substitutions in late nineteenth-century England and the complex situation concerning colour names, often confusing to artists, have been thoroughly documented in technical literature.⁹

Since these kinds of additions to or substitutions of traditional pigments were not disclosed to the customer, pigment and paint manufacturers and suppliers came under increasing suspicion. The artist, as the consumer of low-quality products, was regarded as the victim of the colourmen's modern practices, because 'he is the first to be kept in ignorance of what he is using', as Hunt stated in his 1880 lecture.¹⁰ Artists themselves were, of course, not familiar with pigment and paint manufacturers' practices. They used the paints for practical reasons—because they were inexpensive and offered both bright colours and a huge choice of pre-mixed shades of colour—but also out of ignorance: as Hunt continued, 'it is the want of discriminating power in the painter which produces all the indifference on the part of the preparer to the permanent character of the materials he supplies'.¹¹

With companies such as Badische Anilin- und Sodafabrik (Ludwigshafen) and Friedrich Bayer & Co. (Elberfeld), Germany was at the forefront of the coal tar dye industry, with economic consequences and competitive pressure for traditional manufacturers of earth, mineral and natural lake pigments.¹² When it came to the supply of artists'

'Protokoll des am 27., 28., 29., und 30. September 1893 stattgehabten 1. Kongresses der Deutschen Gesellschaft zur Beförderung rationeller Malverfahren (A.V.) München', *Technische Mitteilungen für Malerei*, 10 (1893), 349–54, 412–38, 449–85, 493–541 (pp. 451–52, 471, 497–501), <https://www.technischemitteilungen.com>.

8 Leslie Carlyle, *The Artist's Assistant*, pp. 158–59.

9 Joyce H. Townsend, Leslie Carlyle, Narayan Khandekar and Sally Woodcock, 'Later nineteenth century pigments: Evidence for additions and substitutions', *The Conservator*, 19 (1995), 65–78.

10 William Holman Hunt, 'The Present System of Obtaining Materials in Use by Artist Painters, as Compared with That of the Old Masters', *Journal of the Society of Arts*, 28.1431 (1880), 485–99 (p. 492).

11 *Ibid.*, p. 492.

12 Carl Duisberg, 'Die moderne Teerfarben-Industrie', *Münchener kunsttechnische Blätter*, 8 (1912), 63–64, 67–68, 71–72. Carsten Reinhardt, *Forschung in der chemischen Industrie: die Entwicklung chemischer Farbstoffe bei BASF und Hoechst, 1863 bis 1914* (Freiberg: TU Bergakad., 1997). Stephen Westland and Qianqian Pan, 'Technology and Trade', in *A Cultural History of Color in the Modern Age*, ed. by Anders Steinvall

watercolours and oil paints, independence from esteemed English and French products was achieved by emerging manufacturers such as Dr. Fr. Schoenfeld & Co. and H. Schmincke & Co. in Düsseldorf.¹³

Concerns about the enormous change in artists' materials, poor quality painting materials, unreliable and profit-oriented colourmen and less knowledgeable artists existed across industrialised countries. As a consequence, in Germany, the *Deutsche Gesellschaft zur Beförderung rationeller Malverfahren* (German Society for the Promotion of Rational Painting Methods) was founded in 1886 in Munich.

This society responded to these growing concerns by running a laboratory dedicated to research, quality control, education and collection of materials. The laboratory was headed by the society's founder Adolf Wilhelm Keim, until it was established as the *Versuchsanstalt und Auskunftsstelle für Maltechnik* (Research Institute and Information Centre for Painting Technology) at the Technical University in Munich in 1903. Himself an inventor of paints—silicate-based mineral paints for wall painting, called *Keimfarben*, that are still produced to this day—Keim was committed to the quality of raw materials and the interests of consumers.¹⁴ He continuously criticised pigment manufactures, in the journal *Technische Mitteilungen für Malerei* and, finally, in his 1903 book *Ueber Mal-Technik* (*On Painting Technique*).¹⁵ Keim took a harsh view of the adulteration of pigments, lack of knowledge among artists and artworks that suffered damage through the use of poor quality painting materials. He demanded transparency in declarations of products and in scientific research and quality control, as well as technical teaching programmes on pigments and paints as part of the training for artists and decorators.

Keim's accusations against manufacturers provoked opposition,

and Sarah Street (London, New York, Oxford, New Delhi and Sydney: Bloomsbury Academic, 2021), pp. 39–56 (pp. 41–44).

- 13 Kathrin Kinseher, 'Painters' paints: the Manufacture of Artists' Colours c. 1900', in *Materiali d'artista: l'atelier del pittore nell'Otto e Novecento*, ed. by Margherita d'Ayala Valva and Joyce H. Townsend (Pisa: Edizione della Normale, 2017), pp. 119–35; Jörg Lesczenski and Andrea H. Schneider-Braunberger, *The Finest Colors for Artists. The History of the Art Paint Factory H. Schmincke & Co.* (New York: Prestel, 2022).
- 14 Kathrin Kinseher, "'We cannot splash light onto our palettes". The 1893 Munich exhibition and congress and its public demand for research on painting materials and techniques', in *Histories of Conservation and Art History in Modern Europe*, ed. by Sven Dupré and Jenny Boulboulé (New York: Routledge, 2022), pp. 13–29 (pp. 17–18).
- 15 Adolf Wilhelm Keim, *Ueber Mal-Technik. Ein Beitrag zur Beförderung rationeller Malverfahren. Auf Grund authentischen Aktenmaterials bearbeitet von Adolf Wilhelm Keim* (Leipzig: Foerster, 1903).

and his book led to a court case shortly after its publication, in which the pigment sold as ‘mummy’ was the subject of dispute. Here, the background and causes of this lawsuit will be examined, showing that the dispute went far beyond a quarrel between a successful pigment company and an uncomfortable idealist such as Keim. It might seem surprising that a pigment from the past, extracted from Egyptian mummies, could induce conflict in modern times, but the same pigment was reputedly buried in the garden of the pre-Raphaelite painter Edward Burne-Jones when he was made aware that the oil paint did in fact include particles from a real mummy.¹⁶

After a century in which there had clearly been an uncontrolled frenzy for paints and pigment manufacture had become the subject of mass production, many new pigments had replaced traditional and established ones. Paint manufacturers and dealers had faced severe criticism, and this court case may well have marked a turning point. Would action be taken to address the concerns about new pigments and processes? And which pigments would win through and hold their place on the early twentieth-century palette?

The Dispute over ‘Mummy’

In what is known as the ‘Mummy Case’, the pigment manufacturer Schröder & Stadelmann filed a lawsuit against the author Keim and the Foerster publishing house in Leipzig. The paint manufacturing company sought compensation, as it believed that a passage in Keim’s book was damaging to its business. Keim accused Schröder & Stadelmann of offering ‘*echter reiner Ocker*’ (‘genuine yellow ochre’) mixed with five percent chrome yellow and of faking the pigment ‘*echte Mumie*’ (‘genuine mummy’) by substituting it with brown ochre.¹⁷ The court ruled in favour of Schröder & Stadelmann and a preliminary injunction was granted as long as the incriminating passage remained in the book. Copies of the book in which the passage has been pasted over actually exist, such as the one donated by Edward Waldo Forbes to the Fogg Museum library and others in private ownership, as shown in Figure 14.1.¹⁸

16 Stella Paul, *Chromaphilia. The Story of Colour in Art* (London: Phaidon, 2017), p. 26.

17 Keim, *Ueber Mal-Technik*, p. 112.

18 See https://archive.org/details/bub_gb_mI4EAAAAYAAJ/page/n133/mode/2up.

Unechtes
Kobaltblau.

nahe bei München, Kobaltblau geliefert, welches sich bei der Untersuchung als Ultramarinblau erwies. — Die Firma soll indessen selbst beim Bezuge dieser Farbe betrogen worden sein. Das Pfund von dieser Farbe war allerdings nur mit 12 Mark berechnet, welcher Preis jedoch für Ultramarinblau viel zu hoch ist.

Diese Stelle ist auf grund einer vom Reichsgerichte mit Urteil vom 5. Januar 1905 bestätigten einstweiligen Verfügung des Königl. sächs. Landgerichtes Leipzig, bis zur Durchführung eines beim letztgenannten Gerichte anhängigen Rechtstreites der Farbenfabrik Schröder & Stadelmann in Oberlahnstein gestrichen.

Der Verfasser.

Handelt es sich in diesen Fällen um Farben für die Künstler, so sollen zur Illustration dieser höchst bedenklichen und für die Zeit doch unhaltbaren Zustände ein paar sehr drastische Fälle Erwähnung finden, die die Farben für den Dekorationsmaler und Anstreicher betreffen, bezüglich welcher Herr Professor Architekt Gabriel von Seidl, wie eben festgestellt, ebenfalls seine schweren Bedenken aussprach.

Maler Stelzenmüller in München teilte dem Verfasser das Resultat einer jüngst vorgenommenen Untersuchung eines als Krapplack in den Handel gebrachten Farbstoffes mit. Dieser Farbstoff ergab: Wasser 0,20, Farbstoff 1,00, Schwerspat 98,80.

Eine Anzahl vom „Untersuchungsamt des Deutschen Malerbundes“ in Kiel für einen Münchener Malermeister im Jahre 1902 vorgenommener Untersuchungen von Farbstoffen ergaben u. a. folgende hochinteressante Resultate: „I. No. 908, Persischrot No. 17. Bleioxyd 48%, Schwerspat 22,6%, Organ. Farbstoff 29,4%. Die untersuchte Farbe besteht aus ca. 50% Bleimennige und

Fig. 14.1. Adolf Wilhelm Keim, *Ueber Mal-Technik* [*On Painting Technique*] (Leipzig: Foerster, 1903), p. 112. Copy in private ownership (Thomas Klug, Keimfarben, Switzerland).

The incriminating passage has been deleted and replaced with an explanation from the author: 'This passage has been deleted due to a preliminary injunction by the Royal Saxon Regional Court of Leipzig, which was confirmed by the Supreme Court of the German Reich by judgement of 5 January 1905, until the outcome of the pending litigation with the colour factory Schröder & Stadelmann. The author'. Photo by Kathrin Kinseher.

Produced from Egyptian mummies, the pigment 'mummy' remained in demand into the early twentieth century and is widely described in the technical literature. Used as a remedy as well as a pigment, mummy was listed in German pharmaceutical price lists and inventories, along with asphalt, from 1475 to 1809.¹⁹ According to the *Pigment Compendium*, the term 'mummy' is derived from the Arabic word *mūmiyā*, meaning bitumen. Asphalt and bitumen were secondary materials in the mummification process. The main materials were desiccating salts, with bandages soaked in plant-derived gums, waxes and resins.²⁰ The pigment is mentioned in the *Liber illuministarum* from Tegernsee Abbey in 1500.²¹ It became a widely used brown pigment in oil painting during the nineteenth century due to its high transparency. George Field refers to it as a more stable and permanent colourant than asphalt, also used as a watercolour:

Mummy, or Egyptian Brown, is also a bituminous substance combined with animal remains, brought from the catacombs of Egypt, where liquid bitumen was employed three thousand years ago in embalming, in which office it has combined, by a slow chemical change, during so many ages with substances which give it a more solid and lasting texture than simple asphaltum; but in this respect it varies exceedingly, even in the same subject. Its other properties and uses as a pigment are the same as those of asphaltum, for which it is employed as a valuable substitute, being less liable to crack or move on the canvas. This also may be used, when ground, as a water-colour.²²

A similar description was included in the *Vollständiges Farben-Laboratorium* from the year 1857.²³ Tints made of mummy pigment for coloured drawings and prints are mentioned in *Kurze Anweisung wie Malereien, Zeichnungen und Kupferstiche auf eine leichte Art zu kopiren sind* (Brief instruction on how to copy paintings, drawings and engravings in an easy way). There, as shown

19 Andreas Burmester, Stefanie Correll, Ursula Haller and Christoph Krekel, *Der Digitale Malkasten*, <https://taxenprojekt.de/waren/?ware=Mumie>.

20 Nicholas Eastaugh, Valentine Walsh, Tracy Chaplin and Ruth Siddall, *The Pigment Compendium: A Dictionary of Historical Pigments* (Amsterdam, et al.: Elsevier and Butterworth-Heinemann, 2004), pp. 269–70.

21 William Jervis Jones, *Historisches Lexikon deutscher Farbbezeichnungen*, 4 (Berlin: Akademie-Verlag, 2013), p. 1929.

22 George Field, *Chromatography*, p. 162, https://archive.org/details/gri_c00033125008687523/page/n5/mode/2up.

23 Christian Heinrich Schmidt, *Vollständiges Farben-Laboratorium*, 3rd edn (Weimar: Voigt 1857) pp. 390–91, <https://digital.deutsches-museum.de/de/digital-catalogue/library-object/BV042003155/>.

in Figure 14.2, 'Mumienbraun' and 'Mumien' appear on colour charts in washes as full tone (200) and in mixtures with other colourants such as 'Wienerlack' (Vienna lake) (209), 'Safran' (saffron) (218), 'Cochenille' and 'Gummigutta' (231), 'Malachitgrün' and 'Saftgrün' (malachite green and sap green) (250), 'Englischgrün' (English green) (252).²⁴



Fig. 14.2. *Kurze Anweisung wie Malereien, Zeichnungen und Kupferstiche auf eine leichte Art zu kopiren sind* [Brief Instruction on How to Copy Paintings, Drawings and Engravings in an Easy Way], 1st edn (Nürnberg: Raspe, 1793), colour chart 6, *Mumienbraun* as fulltone (200) and in mixtures 209, 218, 231. München Bayerische Staatsbibliothek, <https://www.digitale-sammlungen.de/de/view/bsb00077767?page=59>

24 Anonymous, *Kurze Anweisung wie Malereien, Zeichnungen und Kupferstiche auf eine leichte Art zu kopiren sind: nebst einem Unterricht von den Farbenmischungen und den nothwendigsten Begriffen der Wappenkunst für Zeichner und Künstler. Mit Kupfern*, 1st edn (Nürnberg: Raspe, 1793), pp. 32–34, 36, <https://www.digitale-sammlungen.de/de/view/bsb00077767?page=1>; Anonymous, *Kurze Anweisung wie Malereien, Zeichnungen und Kupferstiche auf eine leichte Art zu kopiren sind: nebst einem Unterricht in der Mischung der Farbe für Illuministen und den nothwendigsten Begriffen der Wappenkunst für angehende Zeichner und Künstler. Mit sechs Farbentabellen und mehreren andern Kupfern*, 2nd edn (Nürnberg: Bauer and Raspe, 1821), pp. 32–34, 36, <https://www.digitale-sammlungen.de/de/view/bsb10257985?page=1>.

According to Tolomeï, the pigment could be made in two ways: by grinding the body and bandaging particles together or by extracting the asphalt and resin materials from the body. The latter, producing a more transparent and brighter colourant, was called 'mumiin'.²⁵ Georg Buchner explains the process of creating a shiny, transparent black-brown, water-soluble substance, 'Mumienbraun', by treating the 'light chocolate-coloured' mummy powder with liquid ammonia.²⁶ He also describes the method for confirming the authenticity of the pulverised particles (in other words, whether they had been derived from genuine mummies) by observing their reactions and smell with different chemicals, water and the effect of heat, following the procedure outlined by John J. Conybeare in 1823.²⁷

In artists' paint catalogues, the pigment was listed alongside other shades of brown for oil paints such as burnt earth, dark ochre and asphalt. According to Carlyle, Winsor & Newton, Rowney and Reeves, all discontinued the pigment at the end of the nineteenth century.²⁸ Some colourmakers, however, still kept remains of mummies in storage for making the pigment. Roberson & Co. supplied the colour 'Mummy brown' until the early 1960s.²⁹ Kurt Wehlte mentions that:

Until 1925 genuine mummy was still quite a common shade in comprehensive ranges of artists' colors, and the author himself saw a

25 F. Tolomeï, *Die dauerhaften Farben für die Oelmalerei nebst Anweisung zur richtigen Anwendung derselben, um unveränderliche Gemälde zu erzielen: Ein Beitrag zur Technik der Oelmalerei für Künstler und Kunstfreunde* (Landsberg a. d. Warthe: Schaeffer, 1869), pp. 48–49, <https://digital.deutsches-museum.de/item/BV023344767/>.

26 Georg Buchner, 'Ueber Mumie und Mumiin (Extrait de Momie)', *Bayerisches Industrie- und Gewerbeblatt*, 29 (1897), 368, reprinted as 'Mumien als Rohstoff für Farben', *Technische Mitteilungen für Malerei*, 14.14 (1898), 3–4, <https://www.digitale-sammlungen.de/de/view/bsb11734197?q=%28bayerisches+Industrie-+und+Gewerbeblatt+1897%29&page=380>.

27 *Ibid.*; J.J. Conybeare, 'Untersuchung der Mumie, von dem hochwürdigen J. J. Conybeare, M.G.S.', translated, *Repertorium für die Pharmacie*, ed. by Andreas Buchner and Karl Wilhelm Gottlob Kastner, 15 (Nuremberg: Schrag, 1823), 247–52; J.J. Conybeare, 'Examination of Mumia, &c.', *The Annals of Philosophy*, 5 (1823), 124–26, <https://www.biodiversitylibrary.org/item/53935#page/138/mode/1up>.

28 Leslie Carlyle, *The Artist's Assistant*, pp. 483–84.

29 Lauren R. Bruce, 'The corpse on the canvas. The Story of "mummy brown" paint', <https://artuk.org/discover/stories/the-corpse-on-the-canvas-the-story-of-mummy-brown-paint>; Philip McCouat, 'The life and death of Mummy Brown', *Journal of Art in Society*, <https://www.artinsociety.com>; Leopoldina Torres, 'A pigment from the deaths', <https://harvardartmuseums.org/article/a-pigment-from-the-deaths>.

sizeable remnant of this suddenly unwanted raw material ignominiously fed into the furnaces of von Moeve's color factory in Berlin [G. B. Moewes]. He was able to secure some interesting pieces, which are still in his collection. Among partly decayed bandages, thick arteries and hollow bones can still be clearly recognized. The spaces of these were filled with pure brown-black bitumen with glossy fractures. Disrespectful greed had prompted the transport to Europe of large numbers of mummies.³⁰

As Sally Woodcock points out, there was relatively little ethical concern about the manufacture and the artists' use of mummy pigment, going hand-in-hand as it did with the exploitative trade of mummies and the 'destroying [of] Egypt's archaeological heritage for commercial gain'.³¹ According to newspaper articles in the nineteenth century, mummies were used in many ways for the purposes of making drugs, pigments, fertilisers, fuel and paper, and for entertainment during public mummy unrolling spectacles.³²

Within the category of brown pigments, the transparent pigments *mumiin* and asphalt were included in a German standard colour list called the *Normalfarbenskala* (standard colour list). This was released in 1886 by the *Deutsche Gesellschaft zur Beförderung rationeller Malverfahren* (German Society for the Promotion of Rational Painting Methods) and consisted of pigments that had been obviously proven permanent and reliable.³³ Keim, who had proposed such a list for oil and wall painting, suggested that only well-known inorganic and natural organic pigments that were completely pure and unadulterated should be listed. Before being labelled '*Normalfarbe*' ('standard colour'), both the raw material and the finished product had to be tested by this society. Artists' paint manufacturers, such as Dr. Fr. Schoenfeld & Co., adhered to this idea and produced a range of these standard colours. Schoenfeld's normal oil paints included various shades of brown, such as '*Dunkel-Ocker*', '*Gebrannter Dunkel-*

30 Kurt Wehlte, *The Materials and Techniques of Painting*, trans. by Ursus Dix (New York: Van Nostrand Reinhold Company, 1975), p. 120.

31 Sally Woodcock, 'Body Colour: The Misuse of Mummy', *The Conservator*, 20 (1996), pp. 87–94 (p. 87).

32 *Ibid.*, p. 89; Chris Elliot, 'Bandages, Bitumen, Bodies and Business: Egyptian Mummies as raw materials', *Aegyptiaca. Journal of the History of Reception of Ancient Egypt*, 1 (2017), 26–46.

33 Deutsche Gesellschaft zur Beförderung rationeller Malverfahren, 'Farben-Tabelle der von A. Keim vorgeschlagenen Normalfarben für Öl- und Wandmalerei', *Technische Mitteilungen für Malerei*, 3, (1886), 23.

Ocker', 'Gebrannte grüne Erde', 'Gebrannte Veroneser grüne Erde', 'Gebrannter italienischer Ocker', 'Gebrannte Terra di Siena', 'Umbra' and 'Gebrannte Umbra'. 'Asphalt' and 'Mumiin' were available in a smaller tube size (size four) than that for the natural earth colours. 'Mumiin' was the most expensive of the brown tones offered.³⁴ However, there were doubts about the suitability of the pigment due to its drying qualities, permanence and availability. At the 1893 Munich congress on painting techniques, Keim suggested that *mumiin* be removed from the standard colour list because asphalt, combined with a resinous solution, had similar properties and was more resistant to sunlight.³⁵ The artist and paint manufacturer Fritz Behrendt, who began his business around 1902, adhered to the society's standards. His request for pigment examinations had significant consequences when Keim published the results of the examination of the mummy pigment Behrendt had obtained from Schröder & Stadelmann in *Ueber Mal-Technik (On Painting Technique)*.³⁶

Fighting the Modern Evils of Pigments

Keim's book is not, as the title might suggest, a professional guide to the use of painting materials and techniques. Its subtitle reveals its actual intention: *Ein Beitrag zur Beförderung rationeller Malverfahren (A Contribution to the Promotion of Rational Painting Techniques)*.

The book discusses the necessity and effort of establishing painting technique as a scientific and practical subject for teaching and research in Germany, particularly in Munich and in the Kingdom of Bavaria more widely. As we have already seen, Keim based his claims on the extensive changes in paint manufacturing during the late nineteenth century. As a compilation of various documents, correspondence and articles, the book is an important written source on Munich as 'a centre for painting

34 Düsseldorf, Restaurierungszentrum, Lukas Archive, Dr. Fr. Schoenfeld & Co., catalogue, 1903/1904, pp. 46–47, pp. 4–7 (tube sizes); Kathrin Kinseher, 'Womit sollen wir malen? 'Farben-Streit und maltechnische Forschung in München: Ein Beitrag zum Wirken von Adolf Wilhelm Keim (München: Siegl, 2014), Figure 86a, 86b, p. 125.

35 Deutsche Gesellschaft zur Beförderung rationeller Malverfahren, 'Protokoll des 1. Kongresses. Fortsetzung der Sitzung am 28. September, 8 Uhr abends', *Technische Mitteilungen für Malerei*, 10 (1893), p. 451.

36 Keim, *Ueber Mal-Technik*, p. 112.

materials research since early in the nineteenth century'.³⁷ However, a contemporary review from Switzerland criticised the publication for being 'filled with personal conflicts, ugly quarrels, and disgusting mutual accusations'.³⁸ Nevertheless, it acknowledged the need for change in paint production through scientific control by chemistry.³⁹ Wilhelm Ostwald's review justified Keim's harsh criticism, saying, 'knotty timber requires sharp wedges'.⁴⁰

Keim was a vocal advocate for improving commercial painting materials. In this regard, he can be compared with Hunt, who was similarly a campaigner for durable paintings and permanent painting materials. Hunt dedicated experiments and writings to the quality of artists' materials, as outlined by authors including Leslie Carlyle, Carol Jacobi, Melissa Katz, Joyce Townsend and Jennifer Poulin.⁴¹ Hunt's criticism of the modern practice where 'the artist trusts the colourman, the latter the workman, or wholesale supplier, and so on, until a system of blind confidence has grown up that requires some test and check' served as an

37 Bruce F. Miller, 'Painting materials research in Munich from 1825 to 1937', in *Painting Techniques, History, Materials and Studio Practice: Contributions to the Dublin Congress, 7–11 September 1998*, ed. by Ashok Roy and Perry Smith (London: The International Institute for Conservation 1998), pp. 246–48 (p. 246).

38 Literarisches, 'A. W. Keim, Über Maltechnik. Ein Beitrag zur Beförderung rationeller Malverfahren. Leipzig, Foerster', *Schweizerische Wochenschrift für Chemie und Pharmacie*, 41.28 (1903), 336.

39 *Ibid.*

40 Wilhelm Ostwald, 'Über Maltechnik', in *Wilhelm Ostwald. Maltechnische Schriften 1904–1914. Mitteilungen der Wilhelm-Ostwald Gesellschaft*, ed. by Karl Hansel and Albrecht Pohlmann, Sonderheft 22 (Großbothen: Wilhelm-Ostwald-Gesellschaft, 2005), pp. 46–47 (p. 46), https://www.wilhelm-ostwald.de/joomla/images/sonderhefte/SH_22.pdf.

41 Carol Jacobi, *William Holman Hunt: Painter, Painting, Paint* (Manchester: Manchester University Press, 2006); Melissa R. Katz, 'William Holman Hunt and the "Pre-Raphaelite Technique"', in *Historical Painting Techniques, Materials, and Studio Practice: Preprints of a Symposium University of Leiden, the Netherlands, 26–29 June 1995*, ed. by Arie Wallert, Erma Hermens, and Maja Peek (Marina del Rey: The Getty Conservation Institute, 1995), pp. 158–65, <https://www.getty.edu/publications/resources/virtuallibrary/0892363223.pdf>; Melissa R. Katz, 'Holman Hunt on himself. Textual evidence in aid of technical analysis', in *Looking Through Paintings: The Study of Painting Techniques and Materials in Support of Art Historical Research, Leids Kunsthistorisch Jaarboek*, vol. 11, ed. by Erma Hermens (Baarn: Uitgeverij de Prom and London: Archetype Publications, 1998), pp. 415–44; Joyce H. Townsend and Jennifer Poulin, 'Painting: Materials and Methods', in *Holman Hunt and the Pre-Raphaelite Vision*, ed. by Katharine Lochnan and Carol Jacobi (Art Gallery of Ontario, New Haven: Yale University Press, 2008), pp. 161–68; Carlyle, *The Artist's Assistant*, pp. 158, 269–73, 461–62.

example and confirmation for Keim.⁴² Hunt's 1880 lecture on 'The Present System of Obtaining Materials in Use by Artist Painters as Compared with That of the Old Masters' to the Society of Arts was translated into German and published in the journal *Technische Mitteilungen für Malerei*.⁴³ During the German Society's 1893 Munich congress on painting technique, Hunt was elected as an honorary member.⁴⁴ In *Ueber Mal-Technik*, Keim also references Hunt when discussing concerns about commercial artists' materials and painting methods.⁴⁵

Ueber Mal-Technik includes a chapter entitled 'Ueber die Farben- und Malmittelfabrikation und die Verfälschungen der Farben- und Malmittel in der Gegenwart' ('On the manufacture of colourants and painting mediums and their adulteration in the present day'),⁴⁶ in which pigment manufacturers and distributors are criticised for their unreliability and falsification of pigments. Keim provided numerous examples to support his allegations, stating that pigment powder was either adulterated or incorrectly labelled and that there were discrepancies between brand specifications and the actual chemical compositions. Moreover, he stated that different compositions were labelled with the same name or vice versa, and expensive pigments were substituted with cheaper ones without this being properly disclosed. He explained how bulking agents were used to reduce production costs, highlighting that the prices of finished products were too high in the light of low production costs. Inorganic pigments were also mixed with organic dyes in order to enhance brilliance and luminosity. Keim complained that pigments were bulked out with fillers such as barium sulphate, earth colours were refined with bright but unstable inorganic pigments such as chrome yellow, and impurities which occurred during the production process were tolerated. Manufacturers and companies that supplied the raw materials were held primarily responsible for the poor quality

42 Quoted in Katz, 'Holman Hunt on himself', 1998, p. 428.

43 Hunt, 'The present system', translated from English: Holman William Hunt, 'Das System, nach welchem gegenwärtig die Kunstmaler ihre Materialien erhalten, im Vergleiche zu dem der alten Meister', *Technische Mitteilungen für Malerei*, 2 (1885), addendum to number 11, 49, 54–55, 62–63, 65; 3 (1886), 6–8, 14, 17–19.

44 Deutsche Gesellschaft zur Beförderung rationeller Malverfahren, 'Protokoll des am 27., 28., 29., und 30. September 1893 stattgehabten 1. Kongresses', *Technische Mitteilungen für Malerei*, 10 (1893), 349–54, 412–38, 449–85, 493–541 (pp. 353, 414).

45 Keim, *Ueber Mal-Technik*, pp. 9–10, 19–21.

46 *Ibid.*, pp. 102–39.

of commercial paints. Keim stressed how pigment corruption could significantly affect the durability of artworks and accused Schröder & Stadelmann of upholding a continuous '*Schmierpraxis*' ('practice of smearing').⁴⁷ Keim's statements, of course, tarnished the good reputation of the company conferred by its receipt of a silver medal for its products at the industrial and trade exhibition in Düsseldorf not long before, in 1902.⁴⁸ The company (which still exists today, after several acquisitions, as 'Avient Colorants Germany') was based in Oberlahnstein, and it specialised in natural earth pigments and synthetic iron oxide pigments. It operated its own ochre mines throughout Germany. An advertisement from 1902 also mentions the supply of synthetic organic pigments with names such as '*Echtrot*', '*Moderot*', '*Signalrot*' and '*Solidgrün*'. These pigments were likely purchased from coal tar dye factories, which shows that the company had adapted its range to the demand for new and modern pigments.⁴⁹

In light of numerous debates about pigment contamination, Keim's accusations against manufacturers are actually based on scientific analyses that confirmed the use of aniline dyes, adulteration and misleading colour names. The *Deutsche Gesellschaft zur Beförderung rationeller Malverfahren* tested several pigments by Schröder & Stadelmann in 1902, including the mummy brown pigment at the request of the artist and paint manufacturer Behrendt. The analysis was conducted by Gustav Schultz, a renowned professor of organic chemistry at the Technical University Munich and a member of the *Deutsche Gesellschaft zur Beförderung rationeller Malverfahren*. He found that the mummy pigment was 'brown earth' and did not come from an Egyptian mummy. Out of the seven pigments tested for Behrendt ('*Grünlack A* and '*B*' by Siegle, and '*Mumie*', '*Echtrot*', '*Chromoxydgrün feurig*', '*Cobaltblau*', '*Goldocker*' by Schröder & Stadelmann), only '*Chromoxydgrün feurig*' (viridian) met the quality and *Normalfarben* standards set by the Society in terms of pure pigments without the use of aniline dyes.⁵⁰

47 *Ibid.*, p. 112.

48 Schröder & Stadelmann, advertisement, *Technische Mitteilungen für Malerei*, 19.13 (1903), 156.

49 *Ibid.*

50 Gustav Schultz, letter to Adolf Wilhelm Keim, 30 October 1902, *Deutsche Gesellschaft zur Beförderung rationeller Malverfahren* (E. V.) in München,

During the ongoing legal proceedings of the 'Mummy Case', Keim and Behrendt commissioned further tests on pigments from Schröder & Stadelmann as well as those from other companies. The results confirmed the confusion about colour names, the discrepancy between chemical components and labelling and the use of aniline dyes to enhance colour tone. Among the earth colours sent in by Behrendt, '*Terra Pozzuoli*' had been brightened up with fuchsine and '*Veronesergrün*', a natural earth colour, was contaminated with an organic dye.⁵¹ Examinations of pigments from other factories also revealed some striking results: a product from Siegle & Co. named '*Kaiserblau*' ('imperial blue') turned out to be ultramarine blue and an enhanced cobalt blue. '*Bremerblau I & II*' ('Bremen blue') from Rasquin were shown to be made of alumina-based organic dyes mixed with barite and not the traditional synthetic, inorganic copper carbonate pigment historically associated with the term '*Bremer Blau*'. The samples of the red synthetic dyes '*Echtrot 171 H & 173 H*' from Rasquin were confirmed as aniline dyes precipitated on alumina and barite substrates. The pigment known as '*Kalkgrün*' from Griesdorf & Rabe was shown to be significantly enhanced green earth.⁵² The term '*Kalkgrün*' represented various compositions: natural green earth was either mixed with green aniline dyes, or green dyes were precipitated on green earth which provided a more stable and lightfast product, mainly applied as a limewash. However, the term was also used for synthetically prepared copper carbonate pigments (green verditer) as well as for poisonous copper acetoarsenite pigments (emerald green) in limewash and wall coating.⁵³

In addition, Schultz's subsequent analysis of tube oil paints revealed the presence of additives and aniline dyes: '*Lichter Ocker*' ('light ochre')

'Protokoll der öffentlichen Mitgliederversammlung vom 14. Oktober 1903, Abends 8 Uhr, im Künstlerhause', *Technische Mitteilungen für Malerei*, 20 (1903), 85–92, 98–103, 109–13, 121–24 (p. 103).

51 Gustav Schultz, '*Gutachten*', 22 July 1903 and letter to Behrendt, 13 August 1903, Deutsche Gesellschaft zur Beförderung rationeller Malverfahren (E. V.) in München, 'Protokoll der öffentlichen Mitgliederversammlung', *Technische Mitteilungen für Malerei*, 20 (1903), p. 103.

52 Bremen Blue, https://cameo.mfa.org/wiki/Bremen_blue; Gustav Schultz, letter to Adolf Wilhelm Keim, 30 October 1903, in Munich, Technical University Archive (TUM Archive), HATUM RA C 313.

53 Alexander Eibner, *Malmaterialienkunde als Grundlage der Maltechnik* (Berlin: Julius Springer, 1909), pp. 108, 173–74.

from Dr. Fr. Schoenfeld & Co. was found to contain 'Zinkgelb' ('zinc yellow'), while 'Lichter Ocker 2' did not. 'Gebr. Umbra' ('burnt umber') made by Schmincke & Co. was enhanced with a brown organic dye, and their 'Caput mortuum' contained significant amounts of violet dyes.⁵⁴

Scientific methods to identify the pigment composition of oil paints are given in Schultz's report on his analysis of a tube labelled 'Chrome Oxide Green Deep'. Schultz describes the qualitative and quantitative analysis he conducted. According to his findings, the paint did not contain the inorganic compound chrome oxide, but instead the aniline dyes 'Naphtolgelb S', 'Brillantgrün' and a substrate.⁵⁵ Furthermore, he explains in detail methods for identifying the presence of aniline dyes in paints. This includes their reactions to heating, alcohol and concentrated sulfuric acid.⁵⁶ His examinations provide evidence that the same pigment name was being used for different chemical compositions (for example, 'Chinese white'), and different compositions were labelled with the same specification (for example, 'Indischgelb'). Additionally, there were significant price differences regarding wholesale prices for large quantities compared to the prices offered to end users for small quantities.⁵⁷

Keim, furious about the court's unfavourable first decision to prohibit the allegations against Schröder & Stadelmann made in his book, reported extensively on the case at the Society's public general meeting in Munich in October 1903. The main topic of the meeting was the widespread and evidenced practice of pigment corruption. Keim presented a series of documents and statements to support his allegations against pigment factories.⁵⁸ Not surprisingly, Keim lodged an appeal. At that, he was proven correct, leading Schröder & Stadelmann to file an objection. The case went on for two years and, in the end, a court in Berlin set aside

54 Gustav Schultz, letter to Adolf Wilhelm Keim, 22 December 1903, Munich, Technical University Archive (TUM Archive), HATUM RA C 313.

55 Gustav Schultz, 'Tiefstes Chromoxyd. Eine Wunderfarbe', *Technische Mitteilungen für Malerei*, 18 (1901), 101–02.

56 Gustav Schultz, 'Wie kann man Anilinfarben in Malerfarben nachweisen?', *Technische Mitteilungen für Malerei*, 18 (1901), 115–16.

57 Deutsche Gesellschaft zur Beförderung rationeller Malverfahren (E. V.) in München, *Technische Mitteilungen für Malerei*, 18 (1901), 181–84 (p. 183).

58 Deutsche Gesellschaft zur Beförderung rationeller Malverfahren (E. V.) in München, 'Protokoll der öffentlichen Mitgliederversammlung vom 14. Oktober 1903, Abends 8 Uhr, im Künstlerhause', *Technische Mitteilungen für Malerei*, 20 (1903), 85–92, 98–103, 109–13, 121–24.

the former judgment and overruled Keim's appeal.⁵⁹ However, the court case was not just a private dispute between the two parties involved. The case was widely reported in professional associations of artists, house painters and decorators, and manufacturers. The magazine *Die Werkstatt der Kunst* reported on the trial in the section 'Aus dem Gerichtssaal' ('from the courtroom').⁶⁰ A letter to the editor from Schröder & Stadelmann followed. They requested that the report be revised because it inaccurately stated that regular ochre was sold as genuine mummy pigment and that ochre mixed with five percent chrome yellow was sold as pure ochre. The company stressed that they had manufactured the mummy brown pigment based on a sample previously provided. The cost of genuine mummy pigment was approximately thirty times higher than the price of the product supplied. Furthermore, they stressed that the pigment was not ochre but rather made of the finest Bohemian green earth, contrary to the information provided in Schultz's report.⁶¹

Keim, in turn, quoted Behrendt, who had assumed that 'Mumienbraun' was derived from a real mummy. Behrendt explained that if he had wanted exactly that pigment, he would have ordered 'Burnt Bohemian Green Earth'. He noted that in his experience, the samples he ordered from Schröder & Stadelmann were different from the product delivered. He had ordered pure and unadulterated pigments so as to process them at high quality for his artist customers. As an artist just setting up a paint factory and looking for sources of supply for raw materials, he was not yet familiar with purchase prices.⁶²

The 'Mummy Case' sparked a controversy about proper terminology. Several groups with varying perspectives became involved and shared their comments on the dispute. Keim mobilised his network within the *Deutsche Gesellschaft zur Beförderung rationeller Malverfahren*. He enlisted the help of both artists and chemists to write expert opinions directed against paint manufacturers and confirm that 'Mumienbraun' could only

59 Adolf Wilhelm Keim, 'Erklärung', *Technische Mitteilungen für Malerei*, 21 (1905), 133–34; 22 (1905), 33–34.

60 'Aus dem Gerichtssaal. München', *Die Werkstatt der Kunst*, 2.33 (1903), p. 525.

61 'Aus dem Gerichtssaal. München', *Die Werkstatt der Kunst*, 2.40 (1903), p. 634.

62 Fritz Behrendt, letter to Adolf Wilhelm Keim, 5 May 1903, Deutsche Gesellschaft zur Beförderung rationeller Malverfahren (E.V.) in München, 'Protokoll Mitgliederversammlung', *Technische Mitteilungen für Malerei*, 20 (1903), p. 101; Behrendt, confirmation, 9 October 1903, *Ibid.*, pp. 101–02.

refer to genuine mummy pigment. The documents submitted were crucial for the trial.⁶³ The Society's board, with Franz von Lenbach as the first chairman, also confirmed that the fight against colour adulteration was one of the primary tasks.⁶⁴ Alexander Eibner, Schultz's assistant at that time, intervened with a statement and strongly emphasised that 'Mumie' and 'Mumienbraun' were not fantasy names but explicitly referred to a pigment made from Egyptian mummies which could not be replaced by inorganic pigments—a claim that he would later recant.⁶⁵

Additionally, Keim formed new partnerships with, for example, a professional group of house painters and decorators. His talk on 'Der Farbenswindel und die Notwendigkeit der Bekämpfung derselben durch die Gesetzgebung' ('bogus paints and the need to combat these through legislation') prompted the Munich house painters' and decorators' association to submit a petition to the Bavarian parliament.⁶⁶ Keim was invited to the *Süddeutsche Malertag* in Nuremberg in 1904 as a lecturer on the topic 'Farbenfälschungen und die Ueberhandnahme der Phantasiebezeichnungen in Bezug auf unser Material' ('paint falsification and the prevalence of fantasy names').⁶⁷

On the other hand, Schröder & Stadelmann received support from their peers in the earth and mineral colour associations. They claimed that it was common practice to use fantasy names and that these names did not necessarily indicate the origin or source material of the pigment. The use of fantasy names was, in this account, a widely accepted practice that had no direct connection with the actual colour or its source material. The names merely served to characterise the appearance and shade.⁶⁸ Their

63 Deutsche Gesellschaft zur Beförderung rationeller Malverfahren (E.V.) in München, 'Protokoll Mitgliederversammlung', *Technische Mitteilungen für Malerei*, 20 (1903), pp. 86–91.

64 *Ibid.*, p. 88.

65 Alexander Eibner, 'Ueber „Mumie“ und „Mumienbraun“: Ein Beitrag zur Frage der Aufstellung einer rationellen Nomenklatur der Mal- und Anstrichfarben', *Technische Mitteilungen für Malerei*, 21 (1905), 218–21 (p. 220).

66 Kinseher, *Farben-Streit*, 2014, 141–42.

67 Auszug aus dem Protokoll über die Verhandlungen des Süddeutschen Malertages, abgehalten im Jahre 1904 in Nürnberg. 'Die Farbenfälschungen und die Ueberhandnahme der Phantasiebezeichnungen in Bezug auf unser Material', *Technische Mitteilungen für Malerei*, 21 (1905), 128–30, 136–42, 145–51.

68 Gustav Bodenstein, et al., letters to Schröder & Stadelmann, Deutsche Gesellschaft zur Beförderung rationeller Malverfahren (E.V.) in Munich, 'Protokoll Mitgliederversammlung', *Technische Mitteilungen für Malerei*, 20 (1903), 110–13.

example of *'Bismarckbraun'*, using dark-brown and black-brown organic synthetic colourants and named after the statesman Otto von Bismarck, became a recurring joke throughout the debate.

The practice of using synonyms and fantasy names was widespread in both mineral and earth colour factories, as well as in the coal tar dye industry. Different commercial names were used for dyes with the same chemical composition depending on the manufacturer. Fantasy names such as *'Sonnengelb'*, *'Mikado Orange'* and *'Lederbraun'* were used as well as associate terms for historically inorganic pigments such as *'Chromgelb'*, *'Malachitgrün'* and *'Chromgrün'*, as seen in Schultz's *Farbstofftabellen*.⁶⁹ The adjectives *'echt'* ('genuine') and *'brilliant'* were often used together with the colour-tone name, but did not guarantee the stability of the colourant against sunlight when used as a pigment.

The dynamic between consumers and manufacturers shifted significantly, resulting in a heated and accusatory debate during the ongoing court case. *Farbenschwindel* ('bogus paint') was the dominant topic in the relevant magazines. *Farben-Zeitung* represented the manufacturers' associations, while *Technische Mitteilungen für Malerei* and *Süddeutsche Malerzeitung* represented consumers, with Keim contributing numerous articles to the ongoing controversy.⁷⁰

Regulatory Endeavours

Despite an apparently deadlocked confrontation of opposing interests, some positive developments emerged. Communication and cooperation slowly grew between the Society and professional associations of house painters and decorators on the one hand and paint manufacturers on the other, and in 1904, a commission was established during the *Süddeutsche Malertag* in Nuremberg to combat irregularities in the production and trade of raw and painting materials. In 1905, a congress dedicated to this topic, *Kongress zur Bekämpfung der Farben- und Malmaterialien-Fälschungen* (Congress to combat the forgery of paints and painting materials), took place in Munich. The standard colour list was revised and the *mumiin*

69 Gustav Schultz and Paul Julius, *Tabellarische Übersicht der künstlichen organischen Farbstoffe*, 3rd edn (Berlin: Gaertner's Verlagsbuchhandlung Hermann Heyfelder, 1897), pp. 6, 38, 58, 98, 104, <https://tinyurl.com/ykd3hwm4>.

70 See Kinseher, *Farben-Streit*, 2014, pp. 141–45.

pigment was ultimately excluded.⁷¹ A collaborative project, the *Deutsche Farbenbuch*, was initiated and turned into a complicated long-term project, completed between 1923 and 1926. The author Heinrich Trillich described all of the conflicting ideas that arose during the extensive and intricate process of its finalisation.⁷²

At the *Versuchsanstalt und Auskunftsstelle für Maltechnik* (Research Institute and Information Centre for Painting Technology), Alexander Eibner conducted research on pigments. He carried out numerous experiments on the influence of sulphur-containing pigments on lead white and the compatibility of inorganic pigments in mixtures, as well as conducting tests on the lightfastness of pigments and giving lectures on 'Chemistry in Painting Techniques'.⁷³ From 1906 onwards, the *Versuchsanstalt* was established as a permanent state institution at the Technical University Munich, offering Alexander Eibner the opportunity to emerge as one of the most important German scientists in the field of painting materials. Explanations on the properties of inorganic and organic pigments as well as coal tar pigments were included in his lectures. As a result of his teaching, *Malmaterialienkunde als Grundlage der Maltechnik* (*Painting Materials Science as the Basis of Painting Technique*) was published in 1909. There, Eibner revised his former statement on *Mumienbraun*, explaining that the name described a nuance of brown and that it was the commercial name for a shade of burnt green earth and not for a genuine mummy pigment.⁷⁴ Technical literature on pigments increased steadily, and not only through Eibner's contributions. For instance, Friedrich Linke, professor of the chemistry of paints in Vienna, published the book *Die Malerfarben, Mal- und Bindemittel* (*The Painter's Pigments, Painting- and Binding Agents*) in 1904. He developed a system of nine categories to describe a pigment, for example, 'chemical composition', 'natural or artificial', 'how is it made', 'surrogate', 'substitutes', 'synonyms' and 'adulterations': 'Do

71 'Kongress zur Bekämpfung der Farben- und Malmaterialien-Fälschungen. Munich 1905. Protokoll der Sitzungen des vorbereitenden Ausschusses', *Technische Mitteilungen für Malerei*, 21, 22 (1905), 229–31, 235–42, 3–7, 13–17 (p. 237).

72 Heinrich Trillich, *Das Deutsche Farbenbuch: Allgemeiner Teil*, 3 vols (Munich: Heller, 1923) 1, pp. 11–17.

73 Adolf Wilhelm Keim, 'Vorlesungen über "Die Chemie in der Maltechnik" an der Versuchsanstalt und Auskunftsstelle für Maltechnik an der kgl. Technischen Hochschule in München', *Technische Mitteilungen für Malerei*, 22 (1905), 17–20.

74 Alexander Eibner, *Malmaterialienkunde*, pp. 74, 213–14.

surrogates of pigments exist on the market under the same name? How can these be recognised? Or is the pigment subject to impurities and adulterations? What are the main harmful admixtures? How can they be recognised? Is the colourant sold under different names?⁷⁵

Similar to Linke's system of categories, a workbook for painters training at the Munich school of commerce contained twenty-six questions characterising the properties of a pigment.⁷⁶ Manufacturers suggested a quality system which indicated pigments and colours more precisely using terms such as '*Normalfarben*' ('standard colours'), 'basic colours', 'mixed colours' and 'fantasy designations'. They also proposed to introduce three classifications of usage, for example, artists' pigments, paints for decorative use and wall paintings, and coatings. It was proposed that the chemical group, suitability in the respective binder, lightfastness and toxicity of the pigment be declared. Examples of good practice were given from pigment catalogues and pricelists by Georg Düll, Trillich, Finster & Meisner and the Munich department store Oberpollinger.⁷⁷

Finally, the *Versuchsanstalt und Auskunftsstelle für Maltechnik* was tasked by the Bavarian government to test and examine pigments, raw materials and paints for individuals and public authorities, for a fee. As the annual reports by the *Versuchsanstalt* show,⁷⁸ this opportunity was actively utilised, including repeatedly by Fritz Behrendt who had founded a successful oil paint factory, favoured by artists like Emil Nolde.⁷⁹

75 Friedrich Linke, *Die Malerfarben, Mal- und Bindemittel und ihre Verwendung in der Maltechnik: zur Belehrung über die chemisch-technischen Grundlagen der Malerei für Kunstschulen, Kunst- und Dekorationsmaler*, 2nd edn (Esslingen: Neff, 1908), pp. 32–34.

76 Workbook by Josef Steininger, c.1906–1909, in private ownership.

77 Adolf Wilhelm Keim, 'Praktische Vorschläge zu einem richtigen Farbenkatalog', *Technische Mitteilungen für Malerei*, 22.18 (1906), 237–41. Adolf Wilhelm Keim, 'Zur Farbenkatalog-Frage', *Technische Mitteilungen für Malerei*, 22.19 (1906), 252–53. Adolf Wilhelm Keim, 'Praktische Bekämpfung der Misstände in der Herstellung, im Handel und in der Verarbeitung der Farben und Malmaterialien', *Technische Mitteilungen für Malerei*, 23.21 (1907), 239–40.

78 Manuela Hörmann, 'Der Maler und Farbenfabrikant Fritz Behrendt (1863–1946) aus Grafrath' (unpublished master's thesis, Chair of Conservation-Restoration, Art Technology and Conservation Science, Technical University of Munich, 2020), p. 58, footnote 312.

79 Manuela Hörmann, Heike Stege, Benjamin Mastaglio, Hanna Kirst and Astrid Becker, 'Nolde's Favoured Oil Paints: Artists' Colours from Fritz Behrendt', *Zeitschrift für Kunsttechnologie und Konservierung*, 35.2 (2022), 392–402.

Conclusion

It is worth questioning whether a pigment less ancient, rare and extraordinary than mummy brown would have caused such a long and intense debate about the specification, naming and authenticity of pigments and painting materials in relation to consumer and quality protection. The controversy over the alleged forgery of the mummy pigment is even more surprising given that the trade in Egyptian mummies and the medicines derived from them have themselves been shown to be subject to forgery.⁸⁰ However, it is difficult to identify the ancient Egyptian provenance of mummy pigments due to the variations in ancient Egyptian embalming and mummification practices and the complex organic mixture of mummification balms: 'The complex liquid used for mummification was a mixture of natural products, which varies between examples, but is always some combination of plant oil, animal fat, conifer resin, pistacia resin, natural wax (from bees or plants), and bitumen, plus other possible volatile products which can no longer be detected'.⁸¹ A scientific analysis of a mummy pigment in the nineteenth-century Hafkenscheid Collection, for example, shows that its ancient Egypt origin cannot be proved.⁸²

Keim's book and his legal dispute marked a crucial point in the rapidly growing industry surrounding new pigments and synthetic dyestuffs and their significant impact on all coloured materials. The abundance of new pigments and the lack of knowledge about which were suitable led to systematic research into the characteristics of traditional and modern artists' pigments, and the development of quality standards for artists' paints and house paints.

The trial clearly showed that the composition of artists' paints did

80 Sally Woodcock, 'Body Colour: The Misuse of Mummy', pp. 90–91; Karl H. Dannenfeldt, 'Egyptian Mumia: The Sixteenth Century Experience and Debate', *The Sixteenth Century Journal*, 16 (1985), pp. 163–80 (pp. 170–71, 179–80).

81 Kate Fulcher and Julia Budka, 'Pigments, Incense, and Bitumen from the New Kingdom Town and Cemetery on Sai Island in Nubia', *Journal of Archaeological Science*, 33 (2020), 5–6.

82 Georgiana M. Languri and Jaap J. Boon, 'Between Myth and Reality: Mummy Pigment from the Hafkenscheid Collection', *Studies in Conservation*, 50 (2005), 161–78; Georgiana M. Languri, 'Molecular studies of Asphalt, Mummy and Kassel earth pigments: their characterisation, identification and effect on the drying of traditional oil paint' (doctoral thesis, University of Amsterdam, 2004), <https://dare.uva.nl/search?identifier=9576cd3b-89a2-456f-9cb2-42f4aa2ee8d1>.

not start in the factories of the paint manufacturers. These factories relied, as they still do today, on supplies from pigment producers. There was significant distance in the chain from pigment producer to oil tube, 'and thus the user of the colour is so far away from the maker'.⁸³ As a result, education about the properties of pigments became crucial at art academies and vocational schools.

Keim's resistance could not prevent the spread of coal tar colours in the range of artists' and decorators' paints. However, it sparked systematic research into pigments and paints, leading to standardisations, definitions and the inclusion of technical information in *Das Deutsche Farbenbuch*, in early twentieth-century manufacturers' catalogues and in painters' manuals. Influenced by the *Deutsche Gesellschaft zur Beförderung rationeller Malverfahren*, *Das Deutsche Farbenbuch* refrained from suggesting synthetic organic pigments for artists' paints, although recent scientific examinations of commercial colour charts included in the book have shown that synthetic organic pigments were already part of the book in the form of original swatches of artists' paints.⁸⁴ Apparently, there was no escaping them.

It became evident that complaints and quarrels would be of little salvation to painters victimised by the industrial pigment revolution. Instead, change would come from further research into colourants, and from quality control and the education of consumers.

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83 Hunt 'The present system', p. 492.

84 Clarimma Sessa, Christoph Steuer, Diego Quintero Balbas, Giorgia Sciotto, Silvia Prati and Heike Stege, 'Analytical studies on commercial artists' colour charts from *Das Deutsche Farbenbuch* (1925)—identification of synthetic and natural organic colourants by Raman microscopy, surface-enhanced Raman spectroscopy and metal underlayer ATR-FTIR spectroscopy', *Heritage Science*, 10.109 (2022).

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Epilogue: From Pigments to Pixel

Arnaud Dubois

‘There’s a common misconception that a pixel is a little square of color. But in fact, the pixel is a profound and abstract concept that binds our modern media world together’

Alvy Ray Smith¹

In 1967, the development of colour pixels for NASA’s Apollo Moon Project simulator made colour a central feature of computer displays for the first time. This innovation set the stage for the colourful digital imagery we know today and transformed how we interact with colour. By making colour an essential element in digital displays, the invention of these pixels marked a ground-breaking moment in the evolution of colour technology, driving advancements that continue to shape modern visual media. As Smith explains, colour pixels constitute something far more complex than simply turning individual pixel elements red, green or blue.² A colour pixel is essentially a sample of a visual field where the colour is controlled through a combination of inputs and sampling techniques. These components, controlled digitally, blend at various intensities to produce a specific colour for the pixel that does not inherently ‘store’ colours. This combination of digital inputs—often represented by bits—governs how the pixel interprets the visual data, converting it into a visible colour on the display.³ As such, the creation of colour pixels involves not only scientific and mathematical innovations but also a rethinking of the conception of colour materiality itself and

1 Alvy Smith, *A Biography of the Pixel* (Cambridge, MA: MIT Press, 2021), p. 5.

2 *Ibid.*

3 By the 2000s, 24-bit colour pixels (which can display over 16 million colours) had become the norm.

how colour images are created and displayed.

In the context of examining colour and chromatic materialities in the long nineteenth century, we can consider whether the development of colour pixels not only created new colour digital displays but also advanced methodologies for analysing historical colours from this period. This raises the question of how contemporary digital tools, such as colour pixel technology, can contribute to the accurate reconstruction and analysis of nineteenth-century colour archives and material culture, thus bridging historical materiality with modern digital techniques in both research and visualisation.

Within the development of digital humanities, the integration of colour pixels for exploring nineteenth-century chromatic materiality represents a significant innovation, particularly because it allows scholars to move beyond text-based analysis toward the visual reconstruction of historical artefacts. Indeed, the use of colour pixels facilitates detailed analysis of chromatic data, enabling the reproduction of historical colours with a level of accuracy that was previously unattainable. With this technology, researchers can examine questions of colour materiality, perception and historical context with greater precision, opening new avenues for interdisciplinary research across fields including art history, literature and the history of science and technology.

The ChromoBase, the open-access database of the CHROMOTOPE project, has been conceptualised within this scientific context.⁴ Currently focused on the years 1851 to 1867—chosen to capture both the innovative surge in colour chemistry following the Great Exhibition of 1851 and the showcase of newly developed dyes at the 1867 Exposition Universelle—the ChromoBase is enriched by data sourced from archives, libraries, museums, industrial records and scientific publications, collected and analysed by a multidisciplinary team of colour studies scholars. This historical window marks a pivotal moment in the development and widespread adoption of synthetic dyes, notably with the invention in 1856 of the first aniline dye. By tracing this period of intense scientific, cultural and industrial activity, the ChromoBase aligns its research with

4 <https://chromobase.huma-num.fr>. The ChromoBase as well as the research presented in this epilogue have received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (grant agreement No 818563).

the rapid expansion of dye-making technologies, illuminating the synergy between large-scale exhibitions, pioneering chemical advances and the cultural reception of new colourants.⁵ Its development involves three key methodological concepts: ‘colour narratives’, ‘colour digitisation’ and ‘colour design’, each of which plays a vital role in exploring this new chromatic materiality. Narrative ontology organises the historical ‘colour narratives’ by connecting colour data to cultural, artistic and scientific contexts. ‘Colour digitisation’ refers to virtual representations of historical pigments, dyes and artefacts that recreate the materiality of nineteenth-century colours. ‘Colour design’ provides users with accessible tools to interact with and analyse this colour data, making historical chromatic research more widely available and facilitating detailed analysis. Together, these elements create a dynamic platform that aligns with both CHROMOTOPE’s scientific approach and advancements in computer science and digital humanities, offering a methodological framework that highlights the challenges and innovations involved in the digital exploration of historical chromatic data.

Colour Narrative

The concept of ‘colour narrative’ is central to the data modelling of the ChromoBase and is closely linked to the concept of ‘narrative ontology’, a novel functionality for databases, which emphasises the formal representation of events and relationships within an information system structured through interconnected stories.⁶ As such, in the ChromoBase, colour stories become the central element through which data are organised, in the same way that narrative ontology uses structured relationships to model events and objects within digital libraries. As Carlo Meghini explains, digital libraries, particularly within the cultural heritage domain, are rich in narratives, as every digital object—regardless of medium, genre or type—tells a story.⁷ However, digital

5 Future expansions aim to cover earlier and later dates in the nineteenth century. By broadening the temporal scope, the platform will offer a more comprehensive understanding of colour’s evolution over the century, further reflecting CHROMOTOPE’s commitment to advancing innovative research in colour studies.

6 Carlo Meghini, ‘Representing narratives in digital libraries: The narrative ontology’, *Semantic Web*, 12.2 (2021), 241–64.

7 *Ibid.*

libraries primarily focus on discovering objects like books and images while neglecting the narratives they contain. Within the methodological concept of narrative ontology, the goal is then to elevate narratives so that they become ‘first-class citizens’ in digital libraries, treating them as autonomous data types distinct from bibliographic records and terminologies. In this context, narratives must be formalised as objects, enabling the construction of semantic networks that link events, their formal components and related digital objects.

Following this model and adopting the literary terminology of narratology as borrowed by computer scientists from the Russian formalists—and which, in a certain way, aligns with the epistemological framework of CHROMOTOPE in its relationship with Bakhtin’s concept of chronotope—we could say that the formal components of the ‘ChromoBase narrative ontology’ consist of a *fabula*.⁸ This *fabula* encompasses key events of the nineteenth-century colour revolution, arranged chronologically from 1851 to 1867 and conceptually between the CHROMOTOPE categories of ‘colour materiality’, ‘colour scape’, and ‘colour pedagogy’.⁹ These events are narrated through several stories within this *fabula*, referred to in the Chromobase as ‘colour narratives’. These narratives are linked to the *fabula* through an event association relation. Each ‘colour narrative’, crafted by scholars working in the field of colour studies, and focused on a specific and situated colour

8 As Charlotte Ribeyrol and I explained during the ‘Lundis Numériques’ seminar at the French National Institute for Art History in October 2024, the concept of ‘chromotope’—referring to colour in terms of both space and time—derives from Mikhail Bakhtin’s theory of the novel. For Bakhtin, every major novel operates with a ‘chronotope’, a strong correlation between the time (chronos) and the place (topos) of the action. By choosing ‘CHROMOTOPE’ as the name of her ERC project, Ribeyrol aimed to revisit this key narratological concept and apply it to the chromatic field, demonstrating that from the 1850s and 1860s onwards, colour, long believed to resist the scientific logos, became central to a wealth of new narratives. For the concept of ‘chronotope’, see Bakhtin, M.M. *The Dialogic Imagination: Four Essays*, ed. by Michael Holquist and trans. by Caryl Emerson and Michael Holquist (Austin: University of Texas Press, 1981).

9 In line with the interdisciplinary methodology of the CHROMOTOPE research project, the ChromoBase aims to achieve three key objectives. First, it seeks to uncover the literary and artistic impact of new scientific approaches to chromatic materiality during the latter half of the nineteenth century, a focus known as ‘colour materiality’. Second, it explores how international exhibitions from that period shaped the colourful landscapes of modernity, referred to as ‘colour scape’. Third, it examines how the invention of industrial dyes necessitated new forms of ‘colour education’, also known as ‘colour pedagogy’.

event, instantiates the 'ChromoBase narrative ontology' by creating a semantic network between people, organisations, objects, techniques, colour names and events in the nineteenth-century colour revolution, on a European scale and from an interdisciplinary perspective. By transcending traditional linear data representation, these interconnected narratives enable a dynamic exploration of historical chromatic contexts, facilitating interdisciplinary research and uncovering complex relationships that would otherwise remain hidden in simpler models.

Although it offers deeper insights into the colours of the past, this formal component is inherently linked to the way digital chromatic objects are displayed within the database. It raises complex issues regarding the digital accessibility of nineteenth-century colour archives embedded within each narrative. Furthermore, the inclusion of digital objects introduces significant challenges related to the digitisation of colour materiality in cultural heritage collections, prompting deeper enquiry into the accuracy, representation and preservation of historical chromatic data in digital form.

Colour Digitisation

The ChromoBase seeks to digitally restore coherence to key elements of Europe's chromatic heritage, because many nineteenth-century European colour archives remain undigitised. Innovative methods for colour digitisation were explored to test the platform's capability in accurately preserving and representing historical colour archives, contributing to a more comprehensive and accessible digital resource for chromatic heritage.¹⁰

The digitisation efforts of the CHROMOTOPE team and their collaborators from the CNAM (Conservatoire national des arts et métiers) and the University of Bordeaux have focused on the oldest colour collection of the CNAM in Paris, which is associated with the chemist Jean-François Persoz: the first chair of tinctorial chemistry at the

10 This digitisation was carried out in collaboration with Archéovision, a specialised laboratory of the University of Bordeaux which focuses on applying advanced digital technologies to the preservation and study of cultural heritage. Archéovision is known for using cutting-edge tools such as 3D scanning, digital modelling and visualisation techniques to analyse and conserve historical artefacts, artworks and heritage sites.

CNAM from 1852 to 1868. Persoz played a pivotal role in the nineteenth-century chromatic revolution. Although comparatively far less remembered today than Michel-Eugène Chevreul, Persoz's work and teaching were highly influential for chemists and dyers, and for artists such as William Morris and Georges Seurat. As a result, the CNAM became the depository of several books, specialised periodicals and different objects related to the teaching and practices of dye chemistry in the nineteenth century. One of the specificities of this pedagogical collection is that it associates texts and 'coloured objects', connecting technical explanations on colour chemistry or colourists' recipes with textile samples, dye samples or technical objects. As a hybrid object, which simultaneously contains and exhibits textual data and artefacts, this collection raises the question of how knowledge and dyeing practices were transmitted across Europe in the nineteenth century.

Through the digitisation of selected sample books, as well as items such as the colourant powder for the 1858 fuchsine dye from Renard Frères,¹¹ or technical objects such as Gadd's machine model for four-colour printing from 1859 and its printed cotton sample, the methodological objective was to digitally exhibit and innovatively express the materiality of this colour archive. Rather than presenting them as flat, two-dimensional images, these items were transformed into digital objects, allowing for a more immersive and dynamic representation. This approach aims to rethink the place of these historical materials within our chromatic heritage. Ultra-High-Resolution scanning,¹² for example, offers valuable insights into the relationship between textual, iconographic and chromatic materiality by capturing intricate details that reveal these interconnections.

However, colour digitisation presents a complex challenge when it

11 The fuchsine dye developed by Renard Frères was the earliest French synthetic dye. It is a magenta-coloured dye, part of the aniline family.

12 Ultra-High-Resolution (UHR) scanning is a technology that captures extremely detailed images of objects, artefacts or documents at very high resolution, often exceeding 1000 dots per inch (DPI). This scanning method provides a level of detail far beyond standard resolution, allowing for the analysis of minute features that are crucial for fields such as art conservation, historical research and cultural heritage preservation. UHR scanning can reveal subtle textures, pigments and surface details that would otherwise be invisible, facilitating more accurate digital documentation and study of delicate or complex artefacts.

comes to accurately matching the colours of physical heritage objects with their digital counterparts and ensuring fidelity across various screen displays. This challenge involves balancing a number of factors: capturing both the object's geometric accuracy and texture, while preserving the nuances of colour. Scanning methods often emphasise either texture or colour, making it difficult to capture both without compromising either. The interaction of light with materials (e.g., gloss, surface reflectivity) further complicates this process, requiring advanced algorithms to approximate the appearance of materials. Additionally, variations in display technology, such as differences in monitor calibration, further complicate colour consistency, raising important questions about the limits of current colour reproduction technologies and the need for improved colour management systems to ensure more accurate digital representations.

Nevertheless, the experimentation with colour digitisation carried out for the ChromoBase has offered significant documentary and scientific results. On a documentary level, it has enhanced underrepresented archival collections by facilitating access and enriching previously undigitised materials. From a scientific perspective, the project has advanced how chromatic materiality may be represented in the digital realm. Crucially, it has enabled, for example, the disambiguation of complex relationships between dye composition, textile fibre properties and weaving techniques, highlighting how these factors collectively influence colour perception. This dual contribution fosters new insights into the intersection of material culture and digital technology.

This focus on materiality in both the digital and heritage worlds is further reflected in the design of the ChromoBase, where specific visual tools highlight the seamless integration of scientific accuracy with aesthetic design.¹³ These tools allow for a precise representation of historical colour data, enabling users to explore complex chromatic narratives in an intuitive way.

13 The ChromoBase has been designed by Julie Blanc from Studio Cascade, who specialises in graphic and web design, focusing particularly on projects that intersect with cultural and academic fields. Her work for the ChromoBase involved creating user-friendly interfaces for both public and scholarly audiences while also adhering to scientific standards.

Colour Design

By integrating colour design tools such as the ‘colour wheel’ and ‘colour names’, the ChromoBase creates a dynamic digital platform that can be used by both academic researchers and the general public. Together, these tools improve visual accessibility, facilitate the understanding of complex chromatic data and foster deeper engagement with colour studies.

The ‘colour names’ tab indexes a diverse vocabulary of colour terms used within the colour narratives, and is accompanied by a colour chart that visually represents these terms. This tool allows for a systematic categorisation and standardisation of historical and cultural colour terminology. By associating specific colours with their names and visual representations, this tool not only helps in understanding how colours were perceived and described in different historical contexts but also creates a bridge between historical documents and digital representation. It enables a clearer interpretation of chromatic nuances across various narratives, thereby enhancing our understanding of both the linguistic and visual aspects of colour vocabularies.

The ‘colour wheel’, on the other side, is the indexing tool for a selection of digitally-coloured objects referenced in the database. This tool was inspired by the first colour systems, which included brightness and chroma, published by Michel-Eugène Chevreul in *Des couleurs et de leurs applications aux arts industriels à l’aide des cercles chromatiques* (1864). This was the result of Chevreul’s twenty-five years of research and experimentation with colour as the director of the Gobelins dyeworks in Paris. Building on his earlier work, *The Principles of Harmony and Contrast of Colours* (1839), he devised a precise chromatic nomenclature which ascribed specific technical meanings to colour scale and nuance, thus establishing a highly detailed colour classification scheme. In the ChromoBase version, the first plate shows sixty hues at maximum chroma. This plate is followed by eight colour wheels shading progressively towards black or white. Diagramming the variations in colour obtained by the progressive addition of black or white to the basic colours of red, yellow and blue, these nine chromatic circles present nearly 540 different shades of colour to map the colour space of the ChromoBase’s digitally-coloured objects. This controlled colour model is crucial for analysing chromatic materiality in a precise, quantifiable manner, ensuring that digital representations maintain fidelity to their physical counterparts. The model also facilitates the identification of relationships between

colours, their perception and their historical context, contributing to a more rigorous study of colour in the digital humanities.

Conclusion

One of the challenges in digital humanities projects is to prevent the loss of digital research data by preparing means for their long-term preservation. To future-proof a digital project such as the ChromoBase means that the data must first be organised in such a way that they can be reused by someone who did not participate in their creation, but also that the database itself must be produced with free and open-source software (FOSS), and that the data are expressed in a format accepted by international computer standards. Consequently, the CHROMOTOPE database uses the technologies of Linked Open Data in order to meet the FAIR data principles (Findability, Accessibility, Interoperability and Reusability), enabling the ChromoBase research data to be documented and re-documented for various uses without confining them to inaccessible silos.

In order to process, store and display the ChromoBase research data and prepare for their reuse and long-term preservation, the ChromoBase is hosted by the TGIR Huma-Num: a sustainable digital service on a European scale. Huma-Num is part of France's Very Large Research Infrastructure for Digital Humanities and is supported by the French National Centre for Scientific Research, aligned with the European Strategy on Research Infrastructures roadmap, and having an international reach devoted to the social sciences and humanities. As such, the ChromoBase aligns with the free culture and open science movements by emphasising the sharing and collaborative development of knowledge. By offering unlimited access to both the scientific and technical aspects of its colour research, the ChromoBase fosters a participatory environment where scholars and practitioners can contribute to and refine the understanding of chromatic data. This collaborative approach promotes transparency, innovation and broad accessibility, allowing knowledge to evolve across diverse academic and cultural contexts. This ensures that the knowledge produced is continuously enriched and made widely available for reuse.

The integration of colour narratives, colour digitisation and colour design within the ChromoBase represents a meaningful innovation in

colour studies. By leveraging digital tools and methodologies, it allows, through these elements, for a more detailed exploration of the historical and cultural dimensions of chromatic materiality. The precision offered by colour digitisation, combined with the organisational power of colour narratives, creates new opportunities for examining how colour was experienced and understood in different historical contexts. While the project is still evolving, it has already contributed to expanding the field of colour studies by making colour more accessible, interactive and analysable. This approach encourages continued dialogue between past chromatic practices and modern technological possibilities, broadening our understanding of the key role played by colour in cultural heritage.

Just as a pixel, often misunderstood as a simple square of colour, represents a deeper abstraction as the smallest unit in a complex system of digital imagery, the database of the CHROMOTOPE project illustrates how colour operates as a multifaceted concept. In the ChromoBase, colour is not merely a visual attribute, but a narrative interwoven with cultural, historical and technological contexts. As pixels organise raw data into coherent images, the ChromoBase organises nineteenth-century colour data into interconnected narratives involving colour materiality, cultural practices and innovations, revealing the deeper interconnections that shape historical understandings of colour.

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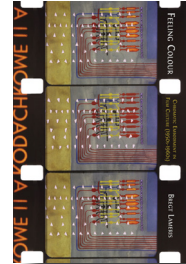
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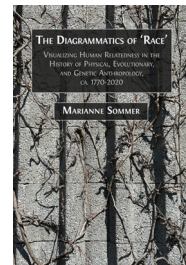


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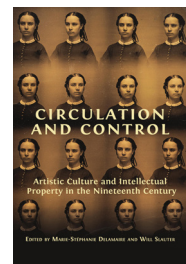


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COLOUR MATTERS

EXPLORING CHROMATIC MATERIALITIES IN THE
LONG NINETEENTH CENTURY (1798-1914)

EDITED BY STEFANO EVANGELISTA, CHARLOTTE RIBEYROL AND
MATTHEW WINTERBOTTOM

Colour Matters provides a fresh investigation of colour in the long nineteenth century. Across fourteen richly researched essays, the book explores the materiality, politics, and sensory experience of colour—from synthetic dyes and chrome pigments to the role of colour in medicine, gender, empire, and identity. By weaving together art history, literature, anthropology, science, and conservation, the contributors reveal a dynamic world where chromatic experimentation shaped aesthetics, technology, and social life. *Colour Matters* offers an essential contribution to colour studies and the humanities' material turn, showing how pigment and perception illuminate both past and present.

This book will appeal to scholars and students of art history, literature, cultural studies, and the history of science in the long eighteenth-century, as well as curators, conservators, and readers fascinated by the histories of colour and material culture.

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